ID: 88076776

Box 2
Item 2-145

U. S. Department of the Interior
Bureau of Land Management

# Centennial Watershed Assessment Report

## Dillon Field Office

**January, 2005**

Price Creek, Centennial Valley

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## Dillon Field Office
## 1005 Selway Drive
## Dillon, Montana

## January 2005

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## Introduction

This document is a land health assessment of the public lands in the Centennial Watershed. This is the first in a series of three documents; the Watershed Assessment Report, the Authorized Officer's Determination of Standards, and the appropriate National Environmental Policy Act (NEPA) documentation with subsequent decision(s) to change management where needed.

This Watershed Assessment reports the assessed condition/function of resources within the assessment area to the authorized officer. The authorized officer considers this report to determine whether Rangeland Health Standards are met. The authorized officer then signs a Determination of Standards documenting where Standards are met and where Standards are not met.

In addition to the condition/function assessment, this report also contains initial recommendations developed by the interdisciplinary (ID) team during the field assessments. Recommendations in this report focus primarily on livestock grazing, timber and fuels management, but also include other programs, land uses, and activities such as noxious weed control, recreation activities and road maintenance activities. Impacts from all uses and programs were assessed and documented as part of this process.

The assessed condition/function and recommendations in the assessment report and Determination of Standards documents will be used in the NEPA documentation to develop alternatives that will be effective in initiating progress towards Proper Functioning Condition (PFC) and site specific objectives, where needed.

The NEPA documentation will be completed in accordance with established procedures to analyze and implement area, allotment or site specific changes. This is a Bureau of Land Management (BLM) regulatory requirement in accordance with 43 CFR 4180.2(c) for allotments in which it has been determined that existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the Standards.

The NEPA document will include all BLM-administered public lands covered in this assessment. Alternative management will be analyzed wherever it is determined that allotments are not meeting the Standards, allotments are meeting the Standards but have site specific concerns, there are unhealthy forest conditions, fuels conditions are outside the natural range of variability or other resources concerns were documented.

Implementation of new plans will begin in 2005, but full implementation of forest treatments, fuels projects, revised grazing rotations and/or range improvement projects associated with these plans may take several years. The new plans will be developed in consultation and coordination with the affected permittees, the State having lands or managing resources within the area and other interested parties. As with all similar BLM decisions, affected parties will have an opportunity to protest and/or appeal these decisions.

## Background

The Centennial Watershed is located in southeastern Beaverhead and southwestern Madison Counties, Montana on the eastern slopes of the Rocky Mountains. The watershed lies in Townships 13-15 South, Ranges 1-7 West and Range 1 East Montana Principal Meridian (M.P.M). The assessment area covers public lands administered by the BLM from approximately Lima Dam in Beaverhead County to the Red Rock Pass in Madison County and from the continental divide along the Montana-Idaho border on the south to the Gravelly Range on the north. This area includes public lands within two hydrologic unit code (HUC) 5 boundaries covering the Centennial Valley. The assessment area boundary shown on Map 1 follows grazing allotment boundaries and includes some allotments that are partially within the watershed.

Within the Centennial Watershed Assessment area boundary, there are approximately 347,543 acres of which the BLM administers 83,102 acres. This report addresses only public lands administered by the BLM within the watershed. However, approximately 59,832 acres administered by the State of Montana Department of Natural Resources (DNRC), 105,718 acres of privately owned lands, 39,231 acres of public land administered by the Red Rock Lakes National Wildlife Refuge, 15,538 acres administered by the USDA Agricultural Research Service (Sheep Experiment Station) and 44,122 acres administered by the US Forest Service (USFS) also occur within the watershed assessment area.

Elevations within the assessment area range from 6,520' along the Red Rock River on the west end to over 10,203' on Mount Jefferson on the east end of the valley. Topography varies from flat valley bottoms to steep mountainous ravines. Vegetation varies from wetland vegetation, three-tip sagebrush (*Artemesia tripartita*) and bluebunch wheatgrass (*Agropyron spicatum*) or black greasewood (*Sarcobatus vermiculatus*) and inland salt grass (*Distichlis stricta*) in the valley bottom to lodgepole pine (*Pinus contorta*), subalpine fir (*Abies lasiocarpa*) and/or whitebark pine (*Pinus albicaulis*) forests along the continental divide. Annual precipitation within the watershed varies from <10" in the lower elevations to >30" in the higher country. Because of the diverse landscape and vegetation within the watershed assessment area, it provides habitat for an abundance of wildlife.

Approximately 27,691 acres of BLM lands within this area are within the Centennial Mountains Wilderness Study Area. A study of these, and surrounding lands (including USFS, Agricultural Research Station (ARS), and State Lands) totaling approximately 92,815 acres was completed in 1990 to assess the suitability of these lands for designation as wilderness. Approximately 21,774 acres of BLM-managed lands, 4,474 acres managed by the USFS near Mt. Jefferson, and 1,160 acres of land managed by the State of Montana were recommended for wilderness designation. Since the Centennial Wilderness EIS decision was completed, approximately 640 acres of those state lands have been added to the BLM-managed acreage. All BLM-managed lands within the wilderness study area, whether recommended for wilderness or not, are managed in accordance with the *Interim Management Policy for Lands under Wilderness Review* (BLM Handbook H-8550-1). This policy requires that wilderness qualities (naturalness, opportunities for primitive and unconfined recreation, etc.) not be impaired until such time as Congress may make a final

decision on whether to designate these lands as part of the National Wilderness Preservation System.

The Centennial Valley contains extensive wetlands. The Red Rock Waterfowl Habitat Management Plan was developed in 1983 to facilitate effective waterfowl management in the Centennial Valley. The Wildlife Habitat Area analyzed in this plan stretches for 23 miles along the Red Rock River from the western boundary of Red Rock Wildlife Refuge westward to the impoundment at Lima Reservoir and encompasses approximately 53,000 acres of mixed ownership of which about 24,000 acres are public lands. This total includes the surface area of Lima Reservoir at normal pool (approximately 5,500 ac). The river is a sinuous system with abundant isolated oxbow channels. The vegetation is typically sedge, rush and bulrush wetland type with very limited riparian woody species along the floodplain which varies from 100 to 200 feet wide.

The Dillon Resource Area Management Framework Plan (Sept. 1979) and the Mountain Foothills Environmental Impact Statement (EIS) - Rangeland Management Program Summary (Feb. 1981) have provided land use plan guidance for the Dillon Field Office for the past two decades. The Dillon Field Office is currently in the process of completing a new Resource Management Plan (RMP) that will provide guidance for all programs in the Dillon Field Office for the next 20 years.

By working on a watershed basis, a broader landscape is considered and more consistent management can be applied. It is the BLM's intent to implement watershed management cooperatively. Any changes in livestock management will be implemented through grazing decisions that address allotments or groups of allotments with a common permittee. Forest health and fuels management treatments or projects and any other management projects or changes will be implemented through Decisions appropriate for the respective programs.

**Prehistory and History of the Centennial Valley**

The Native American presence in the Centennial Valley spans the entire record of documented human occupation in North America. The abundant floral, faunal and lithic resources of this high mountain valley, coupled with the presence of natural travel corridors across the continental divide, has attracted native peoples to the area for the past 10-12,000 years. The uninterrupted use of the area by Native Americans is well documented within the archaeological record, which to date consists of over 76 recorded cultural resources within the Centennial Watershed Assessment area. Early fur trappers traversed the area where they encountered native peoples belonging to the Shoshone, Bannock, Flathead, and Blackfeet Tribes.

In the1870's, major livestock operators like Philip Poindexter and William Orr of the (P&O) Ranch and Marcus Daly of Butte mining fame began utilizing the lush pastures and abundant water of the Centennial Valley for summer grazing of cattle, horses, and sheep. Livestock were trailed on a seasonal basis following old Indian trails along Blacktail Deer Creek from Dillon and the Ruby River from Virginia City and Alder into the valley. In 1876 Mrs. William Orr coined the name Centennial Valley to commemorate the founding of the United States. In 1879 the Utah and Northern Railroad established a railhead at Monida and a road was established along

the south side of the valley. The Monida-Yellowstone Stage Line operated between 1887 and 1908 providing passenger service from the railway line in Monida to Yellowstone Park. Lakeview was established as a halfway stop along the route, and the Levi Shambow family were purported to be the first permanent, year-round residents establishing a homestead in 1888.

In addition to the seasonal grazing by major livestock producers, homesteading in the Centennial Valley continued from the late1880's through the 1920's. Census records show as many as 500 people residing in the valley at the turn of the twentieth century. For most of the homesteaders, livestock grazing in the Centennial Valley followed a common theme, "If the cattle market was good they grazed cattle. If the sheep market was good they raised sheep." Those homesteaders that couldn't handle the harsh winters generally sold out to larger livestock operators who were trying to consolidate land holdings in the valley. With the creation of the Red Rock Wildlife Refuge in 1935 the U.S. Government condemned, and through the process of eminent domain, acquired a majority of the remaining homesteaded lands in the eastern portion of the valley.

Sheep grazing in the valley seemed to peak between 1910 and 1930. Conflicts between cattlemen and sheepmen may have climaxed in 1914 when a sheepherder was killed by a cowboy on what has become known as Battle Mountain in the eastern portion of the valley. During the period before the Taylor Grazing Act was passed as many as nine bands of sheep were competing for grass around Battle Mountain, some being trailed from as far away as Jerome, Idaho. Sheep herding in the area became so important; the USDA Sheep Experiment Station was established at Dubois, Idaho (with its summer range in the Centennial Mountains) by Executive Order in 1922.

**Authorized Uses**

***Forest Products***

Commercial and non-commercial timber harvesting has occurred in the watershed, and BLM sells permits authorizing firewood removal and Christmas tree cutting outside of designated Wilderness or Wilderness Study Areas.

***Special Recreation Permits***

Historically, there have been 2 permits for outfitted big game hunting in the Centennial Mountains. Mel Montgomery continues to operate the Centennial Outfitters, but the permit held by Keith Rush for Lakeview Ranch was terminated when Keith passed away. The historical use levels associated with his permit have been retained in the draft RMP to allow for the possibility of another big game outfitter in the area. Both of these operations also ran summer horseback trips as well, which is not allocated in the draft RMP.

Broken Arrow Lodge (Erwin Clark) is also permitted on the north side of the valley for big game hunting. He holds a lease for hunting on the large block of State lands between Brundage Creek and Metzel Creek, and is permitted on the scattered surrounding BLM lands on the south end of the Gravelly/Snowcrest Ranges.

Hell Roaring Ski Adventures (Tim Bennett) conducts commercial backcountry skiing trips in the Hell Roaring Canyon area.

Matador Cattle Company is permitted to conduct "dude ranch" style cattle operations and summer horseback rides. Although they have been permitted for these activities for at least 6 years, they have never reported any use under this recreation permit.

***Livestock Grazing***

There are 21 individual ranches that have grazing permits on 73,439 acres (41 allotments) of public land administered by the BLM in the watershed. Table 1 lists the 41 allotments that are included in this assessment, the acres within each allotment and the category of each allotment. The allotments are shown on Map 2. All allotments in the Dillon Field Office have been categorized as *Improve* (I) *Maintain* (M) or *Custodial* (C) based on resource values. Unallotted acres were also assessed and are shown. Twelve percent or 9,663 acres of public land administered by the BLM within the watershed is unallotted for livestock grazing. BLM lands provide a large proportion of the late spring, summer and early fall forage base in the watershed. There are 10,733 animal-unit months (AUMs) of livestock forage allocated on public lands within the 41 allotments included in this assessment.

The BLM has worked cooperatively with individual livestock permittees in the watershed for many years to develop Allotment Management Plans (AMPs) to improve grazing management. About 79% of the BLM administered land in the watershed is managed under AMPs prescribing rest rotation or deferred rotation grazing (Table 1). Approximately 8% of the BLM administered acres are in custodial allotments, where BLM management inputs are minimal because of the small proportion of public land in the allotments (See Map 2).

Stocking rate on BLM lands within the watershed averages approximately 6.8 acres per AUM and varies from 1.9 acres/AUM to 42.5 acres/AUM. This variance is influenced by soils, vegetative type, topography (aspect, elevation, and slope), distance from water and local weather.

Table 1 also shows the permittees for each allotment and the grazing system that has been in place since the Mountain Foothills EIS was completed.

**Table 1. Livestock Grazing Allocation and Management**

| Allotment name, number , and category | Permittee | Season of Use | [1]Grazing System | Stocking Rate: cattle | AUMs | BLM Acres | [2]Other Acres | Total Acres |
|---|---|---|---|---|---|---|---|---|
| Antelope Peak #20179 (I) | David Shuett | 5/1 – 10/31 | DR | 4 | 567 | 2319 | 3471 | 5790 |
| Cocanougher Individual # 10738 (I) | Raffety Cattle Co. | 6/1 -10/31 | Season Long | 4.5 | 10 | 45 | 707 | 752 |
| Fish Creek #20172 (I) | Ruby Dell Ranch Inc. | 6/5 – 10/27 | Used In Conj. With USFS | 7.3 | 572 | 4184 | 3987 | 8171 |
| [3]Long Crk AMP #20154 (I) | Matador | 7/15 – 10/15 | RR | 3.3 | 1345 | 4408 | 1723 | 6131 |

| Allotment name, number , and category | Permittee | Season of Use | [1]Grazing System | Stocking Rate: cattle | AUMs | BLM Acres | [2]Other Acres | Total Acres |
|---|---|---|---|---|---|---|---|---|
| Monida Hill #20023 (I) | Huntsman Ranch Co. | 5/20 – 7/10 | Alter. Spring | 16 | 200 | 3219 | 0 | 3219 |
| Munday Reservoir #20176 (I) | James and Elaine Munday | 5/1 – 10/31 | Season Long | 6.1 | 79 | 480 | 10 | 490 |
| Oxbow #20735 (I) | J Bar L Ranches | 5/1 – 11/14 | Rapid Rot. | 3.1 | 871 | 2720 | 4375 | 7095 |
| Passmore SGC #20183 (I) | Ann Simonsen | 8/1 – 9/30 | DR | 5.2 | 16 | 83 | 0 | 83 |
| [3]Peet Creek #10730 (I) | Matador | 7/9 – 9/6 | RR | 19.6 | 241 | 4735 | 3071 | 7806 |
| Phalarope East #20177 (I) | Huntsman Ranch Fam. LP | 6/1 – 10/31 | Season Long | 9.7 | 409 | 3958 | 7172 | 11,130 |
| Price Creek #30040 (I) | Arthur Thompson | 6/15 – 10/15 | RR | 7.8 | 1874 | 14,527 | 5352 | 19,879 |
| [3]Shambo Units #20152 (I) | Matador | 7/10 – 10/30 | RR | 10.2 | 1146 | 11,634 | 2394 | 14,028 |
| Brundage Creek #20708 (M) | Stibal Ranch | 4/15 – 10/30 | DR/Alter. Sea | 4.3 | 912 | 3961 | 2786 | 6747 |
| Centennial #20710 (M) | Centennial Livestock | 7/25 – 10/20 | DR | 5.7 | 93 | 528 | 5110 | 5638 |
| Duff Creek AMP #20688 (M) | Matador | 7/1 – 10/15 | RR | 31.5 | 106 | 3343 | 2451 | 5794 |
| Lima Reservoir #10151 (M) | Matador | 8/10 – 11/30 | DR | 6.4 | 793 | 5103 | 5048 | 10,151 |
| Mud Lake Field #30260 (M) | James & Elaine Munday | 5/15 – 11/15 | Season Long | 7.5 | 36 | 269 | 0 | 269 |
| Red Rock #30636 (M) | River Valley Ranches | 6/1 – 6/14<br>8/10 – 8/23 | RR | 3.3 | 80 | 266 | 87 | 353 |
| Saier Individual #20169 (M) | Volker & Lois Saier | 9/1 – 9/30 | DR | 3.1 | 104 | 321 | 0 | 321 |
| Sand Dunes #20732 (M) | Volker & Lois Saier | 6/1 – 7/15 | Spring | 5.6 | 107 | 599 | 150 | 749 |
| 7L SGC #20153 (C) | Matador | 6/1 – 11/30 | Season Long | 1.9 | 174 | 342 | 34 | 376 |
| Bean Place #10125 (C) | Huntsman Ranch Co. | 5/15 – 10/23 | Season Long | 3.5 | 37 | 129 | 0 | 129 |
| Brundage Bridge #20707 (C) | Stibal Ranch | 5/1 – 11/14 | Season Long | 3.4 | 130 | 443 | 13 | 456 |
| Centennial Isolated #20641 (C) | Centennial Livestock | 5/1 – 12/15 | Season Long | 5 | 8 | 40 | 0 | 40 |
| Cook Sheep Camp #00767 (C) | Eugene & Lois Walsh | 6/16 – 10/7 | Season Long | 40.8 | 7 | 286 | 0 | 286 |
| Curlew #20199 (C) | Buhler Land & Cattle Co. | 6/2 – 9/29 | Season Long | 3.9 | 122 | 478 | 5 | 483 |
| Davis SGC Comm #10737 (C) | Roaring Creek Ranch | 6/1 – 10/15 | Season Long | 24.8 | 18 | 446 | 0 | 446 |
| East Clover Creek #30651 (C) | Hess Land & Cattle | 7/25 – 10/14 | DR | 12.5 | 38 | 476 | 0 | 476 |

| Allotment name, number , and category | Permittee | Season of Use | [1]Grazing System | Stocking Rate: cattle | AUMs | BLM Acres | [2]Other Acres | Total Acres |
|---|---|---|---|---|---|---|---|---|
| Jones SGC #20731 (C) | Matador | 5/1 – 11/15 | Season Long | 4.7 | 26 | 122 | 154 | 276 |
| Long Creek SGC #20157 (C) | Matador | 5/15 – 12/15 | Season Long | 2.9 | 41 | 117 | 43 | 160 |
| Lousy Springs #00763 (C) | Stibal Ranch | 5/1 – 10/14 | Season Long | 5.6 | 110 | 621 | 242 | 863 |
| Mata-Stib SGC #10696 (C) | Stibal Ranch | 5/1 – 12/15 | Season Long | 6 | 90 | 544 | 4 | 548 |
| McCandless Bros. #20185 (C) | Alaska Basin Grazing Assoc. | 6/1 – 10/31 | Season Long | 3.8 | 80 | 300 | 0 | 300 |
| Monida-Corral Cr #00766 (C) | Huntsman Ranch Co. | 6/1 – 11/30 | Season Long | 2.3 | 30 | 70 | 17 | 87 |
| Morton Ind SGC #20163 (C) | Carroll & Nina Wainwright | 5/15 – 11/14 | Season Long | 40.7 | 12 | 488 | 267 | 755 |
| Munday East #20162 (C) | James & Elaine Munday | 5/1 – 10/31 | Season Long | 6.9 | 48 | 333 | 0 | 333 |
| Ritchie SGC #30610 (C) | Stibal Ranch | 5/1 – 11/30 | Season Long | 6.4 | 25 | 160 | 0 | 160 |
| Rody Individual #20685 (C) | Ann Simonsen | 7/1 – 10/30 | Season Long | 5.6 | 20 | 112 | 40 | 152 |
| Shineberger #20159 (C) | Lee Co. Martinell | 5/15 – 11/14 | Season Long | 4.2 | 67 | 280 | 363 | 643 |
| Tom Creek #20701 (C) | Eugene & Lois Walsh | 5/16 – 10/20 | Season Long | 42.5 | 10 | 425 | 0 | 425 |
| Windmill #20733 (C) | J Bar L Ranches | 5/15 – 11/14 | Rapid Rot. | 6.6 | 79 | 525 | 949 | 1474 |
| TOTALS | | | | | 10,733 | 73,439 | 50,235 | 123,674 |

[1] *Abbreviations: RR= rest rotation, DR = deferred rotation*

[2] *Other acres = the sum of USFS, State (DNRC) and private acres.*

[3] *Rangeland Health Determinations related to livestock grazing have been made on these allotments during the past five years and were not repeated during this assessment. Revised livestock grazing management has recently been implement, and only forest health and fuels conditions were examined during this assessment.*

## Process

This assessment was done in accordance with BLM regulations regarding Rangeland Health Standards (Standards):

- BLM Manual H-4180-1 Rangeland Health Standards Handbook and Guidance for Conducting Watershed-Based Land Health Assessments
- Code of Federal Regulation (CFR) 4180
- Record of Decision (ROD) - Standards for Rangeland Health and Guidelines for Livestock Grazing Management (S&Gs) for Montana, North Dakota and South Dakota (Western Montana Standards).
- Healthy Forest Initiative
- Healthy Forests Restoration Act
- National Fire Plan

The preamble of the Western Montana Standards states: "The purpose of the S&Gs are to facilitate the achievement and maintenance of healthy, properly functioning ecosystems within the historic and natural range of variability for long-term sustainable use."

Standards are statements of physical and biological condition or degree of function required for healthy sustainable lands. Achieving or making significant progress towards these functions and conditions is required of all uses of public lands as stated in 43 CFR 4180.1.

Rangeland Health Standards are described in detail in the Record of Decision (ROD) Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota- Western Montana Standards.

This assessment will report condition and/or function for the following five standards:

Standard #1 Upland health
Standard #2 Riparian /wetland health
Standard #3 Water Quality
Standard #4 Air Quality
Standard #5 Biodiversity

In addition, this assessment will report condition and/or function for Forest health and fuels. Forest health can affect each of the five standards, but in this assessment will be reflected under Standard #5 Biodiversity along with other factors that affect biodiversity.

Condition/function statements regarding the Standards are made as:

- ***Proper Functioning Condition*** (PFC)
- ***Functioning At Risk*** (FAR) which is assigned a trend (up, down, static, or not apparent)
- ***Nonfunctioning*** (NF)

These assessments are made on an allotment scale, with the exception of Air Quality and Forest Health which are made at the watershed scale.

Land Health Standards are met when conditions across an allotment are at PFC or FAR with an upward trend. This is dependent on scope and scale and determined by the Authorized Officer.

Available trend monitoring data, existing inventories, historical photographs and standardized methodology are used by an ID team to assess condition and function. In addition, Ecological Reference Areas are identified by the ID team and used to compare health and productivity of similar sites and soils.

Trend monitoring data, riparian assessment data and historic photographs used for this assessment are available at the Dillon Field Office.

## Format

The Upland, Riparian, Air Quality, Water Quality, and Biodiversity Standards and the Forest Health and Fuels will follow the following format:

**1) Affected Environment**
This section briefly describes the area and resources that were assessed.

**2) Analysis and Recommendations**
This section lists the findings, and discloses recommendations developed by the ID team during the field assessments.

# Uplands

Western Montana Standard #1: *"Uplands are in Proper Functioning Condition."*

## Affected Environment

Sagebrush and grassland areas are considered uplands for purposes of this report. According to our satellite imagery of vegetation, 37 percent of the watershed is sagebrush and 29 percent is grasslands.

The variety and distribution of plant communities and seral stages in the watershed area is a function of climate, geology, and soil combined with:

- historic uses (grazing and timber harvest)
- short term weather patterns
- disturbance regimes (drought, fire, floods and herbivory)

**Soils**
Soils in this assessment are affected primarily by climate and parent material. They are in a Cryic temperature regime which means they are cold.

Soils above 7,000 ft elevation in the Centennial Valley receive an average annual precipitation of greater than15 inches. They are deep and mostly well drained and formed from igneous parent material and other rocks. They are mainly in the Silty 15 to 19 inches ecological site.

Lower elevation (6,600 to 7,000 feet) rangeland soils receive 9 to 14 inches of annual average precipitation. These soils are on fans and terraces. Many of the soils near Lima Reservoir and the Red Rock River are hydric (wet). Soils are mainly sandy loams, loams and clay loams. Ecological sites range from Sands to Clayey. Some soils are strongly calcareous while others are slightly to moderately saline.

Table 2 shows the soil types and classifications in Centennial Valley mapped from the Madison County Soil Survey. Soils in the portion of Centennial Valley within Beaverhead County have not been inventoried. The ID team looked at these soils on a site specific basis.
Sebud-Hapgood (118), Redchief-Hapgood (101), Hapgood Loam (55) and Sebud-Hapgood-Rock outcrop are highly susceptible to erosion, especially water erosion. Redchief-Hapgood could be susceptible to compaction. These soil types are located in T.13 S., R.1 W., sections 1 through 12

(Centennial Allotment) and could also be located in the Beaverhead County portion of Centennial Valley.

**Table 2. Soil Types and Classifications**

| Soils in the Centennial mapped from the Madison County Soil Survey. | Classification of soils from Madison County Soil Survey. |
|---|---|
| 123 Shadow complex, warm | Ercree - Coarse loamy pachic cryoboroll |
| 118 Sebud-Hapgood complex | Hapgood - Loamy skeletal pachic cryoboroll |
| 101 Redchief-Hapgood, moist | Leavit - Fine loamy argic cryoboroll |
| 138 Tineman-Earcree complex | Redchief - Clayey skeletal argic cryoboroll |
| 54, 55 Hapgood loam, moist | Sebud - Loamy skeletal typic cryoboroll |
| 119 Sebud- Hapgood-Rock Outcrop | Shadow - Loamy skeletal typic cryochrept |
| 66 Leavit | Tineman - Loamy skeletal typic cryoboroll |
| 41 Earcree sandy loam | |
| 137 Tineman gravelly loam | |
| 98 Poin-Rock Outcrop | |

**Vegetation**

Current vegetative cover was calculated using satellite imagery (SILC 3 data). Some acreage will be under or over estimated, but generally follow the amounts shown in Table 3.

**Table 3. Summary of SILC Acres by General Cover Type**

| Description | All Land | % of Total | BLM Land | %BLM | % of BLM Total |
|---|---|---|---|---|---|
| Agriculture | 3,761.01 | 1.05 | 84.07 | 2.24 | 0.10 |
| Grassland | 102,895.53 | 28.73 | 15,734.46 | 15.29 | 18.93 |
| Willow / Mesic Shrub | 13,974.03 | 3.90 | 1,059.45 | 7.58 | 1.27 |
| Sagebrush | 131,394.71 | 36.69 | 33,878.58 | 25.78 | 40.77 |
| Aspen | 32,977.65 | 9.21 | 3,595.50 | 10.90 | 4.33 |
| Lodgepole / Douglas Fir | 10,287.89 | 2.87 | 3,657.19 | 35.55 | 4.40 |
| Douglas Fir | 40,633.39 | 11.35 | 19,455.57 | 47.88 | 23.41 |
| Whitebark Pine | 814.04 | 0.23 | 394.59 | 48.47 | 0.47 |
| Subalpine | 6,871.98 | 1.92 | 4,061.22 | 59.10 | 4.89 |
| Rock/Water/Snow | 14,487.38 | 4.05 | 1,181.16 | 8.15 | 1.42 |
| **Totals** | **358,097.61** | **100.00** | **83,101.79** | **23.21** | **100.00** |

% of Total = Percent of acreage for each land type for all land.
% BLM = Percent of acreage for each land type that BLM manages
% of BLM Total = percentage of acreage for each land type for all BLM land.

Most upland habitats on BLM lands within the Centennial Watershed are dominated by sagebrush including three subspecies of big sagebrush (mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), basin big sagebrush (*Artemisia tridentata ssp. tridentata*), Wyoming big sagebrush (*Artemisia tridentata spp. wyomingensis*), low sagebrush (*Artemisia arbuscula*

*spp. arbuscula*), three-tip sagebrush (*Artemisia tripartita*) and silver sagebrush (*Artemisia cana*). The highest elevation shrub types support mountain big sagebrush/Idaho fescue (*Festuca idahoensis*) habitats. Basin wildrye (*Leymus cinereus*), green needlegrass (*Stipa viridula*) and tall forbs are commonly found in the mountain big sagebrush sites along the south side of Centennial Valley. Wyoming big sagebrush is uncommon in the Centennial Valley and is only found in a few areas along the western edge of the valley.

Sandy soils and sand dunes are found on the east end of the valley bottom. Basin big sagebrush is found in these areas intermixed with three-tip sagebrush with an understory that includes sand wildrye (*Elymus arenicola*), Indian ricegrass (*Oryzopsis hymenoides*), needle-and-thread grass (*Stipa comata*) and several buckwheat species (*Eriogonum spp.*).

Three-tip sagebrush is common throughout the watershed and can be found intermixed with basin big sagebrush, mountain big sagebrush and low sagebrush.

Low sagebrush is present along lower benchland or valley bottom areas that receive less rain and have drier soils (clayey, shallow to gravel, silty-limey, sandy). Grasses commonly associated with the low sage and three-tip sage sites include bluebunch wheatgrass, western wheatgrass (*Agropyron smithii*), Sandberg's bluegrass (*Poa sandbergii*), and needle-and-thread grass.

Salt affected and limey soils are found in some areas in the valley bottom. Black greasewood and Nuttall saltbush (*Atriplex nuttallii*) are found in the salty soils in association with basin wildrye, inland saltgrass (*Distichlis stricta*), alkali cordgrass (*Spartina gracilis*), bottlebrush squirreltail (*Sitanion hystrix*) and western wheatgrass. Winterfat (*Ceratoides lanata*) and gray horsebrush (*Tetradymia canescens*) are found in the limey soils along with Indian ricegrass, western wheatgrass and needle-and-thread grass.

Rubber rabbitbrush (*Chrysothamnus nauseosus*), green rabbitbrush (*Chrysothamnus viscidiflorus*), fringed sagewort (*Artemisia frigida*) and broom snakeweed (*Gutierrezia sarothrae*) are common native shrubs found on numerous ecological sites throughout the watershed. If any of these shrubs have greater than 5% canopy cover on a site, it usually indicates that site has been subject to some kind of past disturbance.

**Vegetative Treatments**

According to BLM records, there have only been two minor vegetative treatments in the sagebrush steppe areas on public lands in Centennial Valley. In 1959, 320 acres were sprayed with 2,4-D in the Fish Creek Allotment to control mules ear or Wyethia (*Wyethia amplexicaulis*). The project file indicates that this project also killed the sagebrush in this area. The location of the treatment was T. 13 S., R. 3 W. NE ¼ sec. 4 and NW¼ and the W½, NE¼ sec. 3. Twenty acres were seeded in the Lima Reservoir Allotment in 1984 (T.14S., R.5W., section 5 SE¼) with a seed mix of western wheatgrass, Canada bluegrass (*Poa compressa*), and cicer milkvetch (*Astragalus cicer*). The project was done to enhance cover and forage for waterfowl. .

**Noxious Weed Infestations**

Spotted knapweed (*Centaura maculosa*) is one of the more aggressive noxious weeds in the area administered by the Dillon Field Office. Spotted knapweed is found scattered in small infestations throughout the Centennial Valley, primarily along roads and in other disturbance areas. Because of where it is found, the potential is high for knapweed to be spread by vehicles, livestock, wildlife, recreation and other activities.

Houndstongue *(Cynoglossum officinale),* a noxious weed that is toxic to animals due to high levels of alkaloids contained in the plant, is found scattered throughout the valley in moderate sized infestations along roads, trails, and streams. Because of its seeds ability to cling to hair and clothing, the potential is high for it to be spread rapidly within the watershed.

Other noxious or invasive weeds present in isolated locations are cheatgrass (*Bromus tectorum*) hoary cress (Whitetop) *(Cardaria draba)*, black henbane *(Hyoscyamus nigar),* poison hemlock *(Conium maculatum),* common tansy *(Tanacetum vulgare),* and Canada thistle *(Cirsium arvense).*

Since 1989, BLM has been involved in cooperative control efforts with Beaverhead and Madison Counties. Throughout this period, the goal has been to prevent new noxious weed infestations and control or eradicate existing infestations in Beaverhead and Madison Counties using Integrated Pest Management.

Herbicide treatments have been applied by ground, as well as aerial application in the Centennial Valley. In 2004, 70 acres were treated and over 3500 acres inventoried. In 2003, 40 acres were treated and 1200 acres were inventoried. In 2002, 179 acres were treated and 2400 were inventoried. Due to the small size of the knapweed infestations, the harshness of the climate and the elevation of the valley, no biological controls have been released.

## Analysis and Recommendations

**Procedure to determine conformance with Standard**

The uplands were assessed on an allotment basis according to Interagency Technical Reference 1734-6 "Interpreting Indicators of Rangeland Health". This methodology is a qualitative assessment designed to be used by an ID team to interpret the upland health indicators. This qualitative assessment incorporates an order 3 soil survey, if available, along with current quantitative data on vegetative trend. Members of the ID team visited 37 allotments including 62,208 public land acres during 2004 and completed 20 *Rangeland Health Indicator Evaluation Matrices* (qualitative assessments) on various ecological sites and plant associations scattered throughout the watershed. In addition, 25 Daubenmire trend studies and 44 permanent photo plots that were established in the early 1980's were duplicated in 2003 and 2004 to help determine vegetative trend on BLM upland sites within the watershed. Current data was summarized and compared to baseline data and used as supporting information to aid in interpreting the biotic indicators. Ecological Reference Areas were also identified and used by the ID Team to compare health and productivity of similar sites throughout the assessment area. Upland health assessments were not completed at this time on the Long Creek, Long Creek SGC,

Peet Creek and Shambo Units Allotments because they were completed within the past five years and livestock management has since been revised.

The watershed was also evaluated for weed infestations using our existing spraying records and inventories from the Beaverhead and Madison County Weed Coordinators, the Dillon Field Office Weed Specialist and our collective observations during the field assessments.

**Findings for Upland Health**

A summary of the indicator attributes and degree of departure from that expected for the sites visited is presented in Table 4. A moderate departure from expected conditions is somewhat analogous to a "functional at risk" rating (DOI BLM 2000). The ID team considered sites that exhibited "none to slight" or "slight to moderate" departures from expected conditions in all three categories to be in "proper functioning condition".

**Table 4. Findings of Upland Health Qualitative Assessments**

| Allotment Name and Elevation | Ecological Site | Existing Plant Association | Degree of Departure from that Expected | | |
|---|---|---|---|---|---|
| | | | Soil Site Stability | Hydrologic Function | Biotic Integrity |
| Antelope Peak – 6778' | Silty 15-19 | Three-tip sagebrush/Idaho fescue | slight to moderate | slight to moderate | slight |
| Fish Creek – 7400' | Silty 15-19 | Mountain sagebrush/Idaho fescue | none to slight | none to slight | slight |
| Monida Hill – 6619' | Clayey 10-14 | Low sagebrush/bluebunch wheatgrass | slight | slight to moderate | slight to moderate |
| Munday Res. – 6600' | Silty-Limey 10-14 | Low sagebrush/thickspike wheatgrass | slight to moderate | slight to moderate | moderate |
| Phalarope East – 6723' | Silty 10-14 | Three-tip sagebrush/bluebunch wheatgrass | moderate | moderate | slight to moderate |
| Price Creek – 6633' | Clayey (salty) 10-14 | Three-tip sagebrush/bluebunch wheatgrass | slight to moderate | slight to moderate | slight to moderate |
| Price Creek – 7158' | Silty 15-19 | Three-tip sagebrush/bluebunch wheatgrass | slight to moderate | slight to moderate | slight |
| Brundage Cr – 7000' | Silty 15-19 | Mountain sagebrush/Idaho fescue | none-slight | none-slight | none-slight |
| Brundage Cr – 7200' | Silty 15-19 | Mountain sagebrush/Idaho fescue | none-slight | none-slight | none-slight |
| Duff Cr AMP – 7550' | Silty 20-24 | Douglas-fir/pine grass | none-slight | none-slight | slight to moderate |
| Lima Reservoir AMP– East 6617' | Shallow to Gravel 10-14 | Three-tip sagebrush/thickspike wheatgrass | slight to moderate | slight to moderate | slight to moderate |
| Lima Reservoir AMP – West 6660' | Clayey 10-14 | Low sagebrush/bluebunch wheatgrass | slight to moderate | slight to moderate | slight to moderate |
| Mud Lake Field – 6690' | Silty-limey 10-14 | Low sagebrush/bluebunch wheatgrass | slight to moderate | slight to moderate | slight to moderate |
| Sand Dunes – 6710' | Sands, sandy 15-19 | Three-tip sagebrush/Idaho fescue | none-slight | none-slight | none-slight |
| Saier Ind – 6650' | Silty 15-19+ | Three-tip sagebrush/Idaho fescue | none-slight | none-slight | none-slight |
| Mata-Stib – 6650' | Silty 15-19 | Three-tip sagebrush/bluebunch wheatgrass | slight to moderate | slight to moderate | slight to moderate |
| McCandless - 6900' | Silty 20-24 | Mountain sagebrush/Idaho fescue | none to slight | none to slight | slight |
| Ritchie SGC – 6620' | Silty 10-14 | Three-tip sagebrush/thickspike wheatgrass | slight to moderate | slight to moderate | moderate |
| Shineberger – 6644' | Silty (salty) 10-14 | Three-tip sagebrush/thickspike wheatgrass | slight | slight to moderate | slight |
| Tom Creek – 7246' | Silty 20-24 | Mountain sagebrush/Idaho fescue | none to slight | none to slight | slight |

Thirty-five allotments and the unleased tracts totaling 57,610 acres of public land within the watershed rated as PFC or FAR with an upward trend for upland health. This equals 93% of the acres assessed for upland health within the watershed. Three allotments totaling 4,598 acres of public land within the watershed rated as FAR with static or downward trends. This equals 7% of the acres assessed for upland health within the watershed. These three allotments are Phalarope East, Munday Reservoir and Ritchie SGC.

**Analysis of Upland Health**

On the sites that were found to be FAR with an upward trend or PFC, the results of trend data and the qualitative assessment generally showed a static or improving vegetative trend or ecological state. The erosion that was present is what was expected or only a slight departure from what was expected for that ecological site. Evidence of erosion appeared to be remnant of historical impacts. There were conifer encroachment concerns identified in some areas of the Price Creek, Peet Creek, Shambo Units, Cook Sheep Camp, Davis SGC Common, Morton Individual SGC, Tom Creek and Duff Creek Allotments as well as in the unleased tracts along the south side of Centennial Valley (Duff Creek to Tom Creek). Some open sagebrush/grasslands draws and most aspen stands are being lost to Douglas-fir (*Pseudotsuga menziesii*) colonization in the absence of fire. Tall cool season bunchgrasses, specifically bluebunch wheatgrass was slightly to moderately reduced in many sites throughout the watershed in comparison to the Ecological site guides. This is likely due to long-term spring and summer cattle grazing in the valley. The ID team also found sites that were in excellent ecological condition and used them as Ecological Reference Areas. Throughout the valley bottom, the low sagebrush was decadent or dead everywhere it occurred. The ID team attributed this to the long term drought cycle that we are currently experiencing.

Other than the conifer encroachment concerns, which will be discussed later in this document and the other concerns noted, existing management appears to be improving or maintaining upland health conditions across 35 allotments and the unleased tracts.

Trend studies completed for the Phalarope East Allotment and comparisons with Ecological Reference Areas generally showed a static or declining vegetative trend or ecological state for sites evaluated within ½ mile of Lima Reservoir. Conditions improve as the distance from the reservoir increases. The majority of public land within the allotment is within ½ mile of the reservoir. Upland health conditions in areas more than about ½ mile from the reservoir are being maintained or improving (PFC or FAR with an upward trend). Daubenmire trend data was not available for the Munday Reservoir and Ritchie Allotments. Function was determined through comparison with Ecological Reference Areas and Ecological Sites Guides. Both were determined to be FAR with a static or unapparent trend. In all three of these allotments, composition of perennial cool season bunch grasses is well below that expected for the site. Vigor of existing cool season bunchgrasses is below expected, even considering the drought. Present erosion sometimes exceeded what was expected for that ecological site as evidenced by pedestals around the vegetation and water flow patterns larger than expected, especially in plant interspaces.

Current grazing management practices such as the season, intensity, frequency, and/or duration of livestock grazing seem to be contributing to perpetuating unhealthy uplands across relatively large portions of public lands within these three allotments.

Spotted knapweed is scattered in trace amounts in isolated spots throughout the watershed. Houndstongue was also found sporadically around disturbances or in localized areas, specifically within the Rody Individual Allotment. Cheatgrass was noted as a concern, specifically on the south facing slopes along the northwest part of Lima Reservoir. Canada thistle was found in localized areas mainly along riparian bottoms. Therefore, the potential for the expansion of weeds is a concern. The identified infestations of noxious and invasive weeds on public and private lands could continue to spread if we reduced our weed management efforts. Human activities, such as road maintenance activities, recreation, gravel mining, logging, and other disturbances, as well as livestock, wildlife and birds, wind, water and fire have the potential to spread weeds into and within the watershed. At present, we are advancing our control of noxious weeds through public education and herbicide control along roadways, in the gravel pits, in hunting camps, around water developments, and other areas of concentrated use.

**Recommendations for Upland Health**

1. Maintain current seasons of use combined with appropriate rest or deferment on the 35 allotments that exhibit healthy or improving upland conditions.

2. Continue to address localized weed infestations cooperatively with Beaverhead and Madison Counties, The Nature Conservancy and other landowners and partners as appropriate. Continue the existing education effort on weed identification with permittees and other people who use this area.

3. Consider and analyze using prescribed fire, mechanical treatments, or other means to mitigate conifer encroachment into sagebrush, grassland sites or aspen stands. This will be discussed further under "Forest Health and Fuels Management".

4. Follow best management practices during drought or other natural disturbance events.

5. Address site specific concerns as needed on allotments in which the uplands are generally healthy or improving.

6. Develop AMPs for the Phalarope East, Munday Reservoir and Ritchie SGC Allotments. Changes in timing, duration, frequency and/or intensity of grazing should be considered. Rest and/or deferment should be incorporated into these allotments. Salting locations, herding and/or applicable range improvement projects should also be examined to determine how these tools can be used to mitigate resource concerns.

## Riparian and Wetland Areas

Western Montana Standard #2: *"Riparian and wetland areas are in proper functioning condition"*

### Affected Environment

Red Rock River, Lima Reservoir and Red Rock Lakes are dominant surface water features in Centennial Valley. Red Rock River originates at the east end of the valley in Alaska Basin.

The Centennial Valley contains vast wetland resources. Red Rock Lakes, which are located within the National Wildlife Refuge, are important to the hydrology of the valley. According to National Wetland Inventory (NWI) data, there are 45, 639 acres and 538 miles of wetlands in Centennial Valley. Palustrine wetlands account for 75% of the acres and 82% of the miles of this resource. The BLM is responsible for 2,954 acres and 140 miles of wetlands in the Centennial Valley. The riparian and wetland areas are shown on Map 3.

The Lima Dam was originally constructed in 1875 and the current dam was reconstructed in 1934. This resulted in the creation of the Lima Reservoir, flooding a portion of the Red Rock River and its historic floodplain. The operation of the dam results in an unstable environment for the establishment of shoreline wetlands. The Centennial Valley, as well as the rest of southwest Montana, is currently in the sixth year of a severe drought. The water table has dropped and the impact to wetland hydrology is evidenced by decreased vigor of wetland plants and drying up of wetlands. NWI data was used by the ID team to aid in identifying wetland areas, and interpretation of the NWI data coverage in the valley indicates that wetlands are vigorous (intact hydrological functions, representative native plant communities, outstanding wildlife values, and/or rare plant and animal species) only where there is sufficient water available. An example is an extensive emergent palustrine wetland complex located in the Curlew Allotment along the north shore just above Lima Dam.

The high gradient mountain streams flow out of the Centennial Mountains, and as these streams enter the valley bottom their character changes. Often the streams from the Gravellys and the Centennials are diverted for irrigation. The low gradient valley streams and associated floodplains developed in glacial materials and are maintained by sediments transported from the mountain streams. Flows coming out of the Centennial Mountains have large seasonal variations. The largest flows generally occur during spring or early summer because of snow melt and rainstorms.

The Shambo Units, Peet Creek, Long Creek, and Long Creek SGC allotments were previously assessed for riparian health. On the remainder of the watershed, there are 26 allotments and several unleased tracts which have stream reaches or wetlands identified within the Dillon Field Office Riparian Database. The Dillon Riparian Database and NWI digital data layers were used to identify wetlands. There are 842 acres and 86 miles of wetlands according to the Dillon Riparian Database. Table 5 provides a list of the allotments, the streams and wetlands, common riparian community types and miles and/or acres of riparian resources.

**Table 5. Riparian and Wetland Habitat[1]**

| Allotment Name and # | Streams and Wetlands | Riparian Community Types Hanson et. al. 1995 | Stream Miles | Wetland Acres |
|---|---|---|---|---|
| Bean Place 10125 | Bean Pond | *CARAQU* | | 5 |
| Brundage Bridge 20707 | Red Rock River<br>Stibal Pond | *ELEPAL/HORJUB*<br>*CARUTR* | 1.1 | 5 |

| Allotment Name and # | Streams and Wetlands | Riparian Community Types Hanson et. al. 1995 | Stream Miles | Wetland Acres |
|---|---|---|---|---|
| Brundage Creek 20708 | Red Rock tribs | *CARUTR*<br>*SALGEY/CARUTR* | | 3 |
| Cocanougher I 10738 | Cocanougher Draw | *ELEPAL/HORJUB* | 0.5 | |
| Curlew 20199 | Lima tribs, Lima Reservoir | *ELEPAL/HORJUB*<br>*SALEXI* | .8 | 28 |
| Davis SGC 10737 | Hellroaring | *PICEA/EQUARV* | 4 | |
| Duff Creek 20688 | *Seven Reaches*<br>Curry, Duff, Humphrey, Matsingale, Shambow | *PICEA/GALTRI* | 10 | |
| East Clover 30651 | Clover trib | *SALGEY/CARUTR* | 0.6 | |
| Fish Creek 20172 | Fish Creek<br>Metzel Creek | *POTFRU/DESCES*<br>*CARUTR* | 4.4 | |
| Jones SGC 20731 | Bean Slough | *ELEPAL/HORJUB* | | 5 |
| Lima Reservoir 10151 | Clover, Shineberger, Wolverine, Lima Reservoir shoreline and tribs | *CARUTR*<br>*ELEPAL/HORJUB*<br>*POTFRU/DESCES* | 3.5 | 266 |
| Mata-Stib SGC 10696 | Red Rock trib | *DESCES* | 0.4 | |
| Monida Hill 20023 | Huntsman, Monida, Lima Reservoir shoreline and tribs | *ELEPAL/HORJUB*<br>*JUNBAL/CARPRA* | 3.8 | 73 |
| Morton Ind SGC 20163 | Corral Creek | *PICEA/GALTRI* | .9 | |
| Mud Lake Field 30260 | Mud Lake | *JUNBAL/CARPRA* | | 30 |
| Munday Reservoir 20176 | Lima trib, Lima Reservoir | *ELEPAL/HORJUB* | .5 | 55 |

| Allotment Name and # | Streams and Wetlands | Riparian Community Types Hanson et. al. 1995 | Stream Miles | Wetland Acres |
|---|---|---|---|---|
| Oxbow 20735 | Mud trib, Peet Creek, Red Rock River, Bean Reservoir | *CARUTR* | 9.8 | 1 |
| Passmore SGC 20183 | Jones Creek, Doras Pond | *ELEPAL/HORJUB*<br>*CARUTR* | .5 | 5 |
| Phalarope East | Lima Reservoir tribs and shoreline | *ELEPAL/HORJUB*<br>*SALGEY/CARUTR* | 7.9 | 89 |
| Price Creek 30040[2] | Corral Creek, Peet Creek, Price Creek, Ritchie Pond, Sand Creek, Lima Reservoir shoreline, Mud Lake | *SALGEY/CARUTR*<br>*ELEPAL/HORJUB*<br>*PICEA/CORSTO*<br>*JUNBAL/CARPRA* | 39.1 | 236 |
| Red Rock 30636 | Red Rock River | *SALGEY/CARUTR* | 1 | |
| Ritchie SGC 30610 | Stibal Ritchie | *JUNBAL/CARPRA* | | 30 |
| Rody Individual 20685 | Lima Reservoir | *POPANG/HERB* | | 10 |
| Shineberger 20159 | Shineberger Creek | *CARUTR* | .8 | |
| Tom Creek 20701 | Tom Creek | *PICEA/GALTRI* | 2.3 | |
| 7L SGC 20153 | Blake Pond<br>Blake Slough | *JUNBAL/CARPRA*<br>*CARAQU* | 1.1 | 1 |
| Unalloted | East Corral, Monida, Odell, Price, Red Rock River, Shambow | *PICEA/GALTRI*<br>*CARUTR* | 7.1 | |
| **Totals** | | | **86.4** | **842** |

[1] Data from Dillon Field Office Riparian Database. Community Types from Hansen, et al. (1995) and Cooper, et al. (1995, 1999).

[2] The Price Creek Allotment has 51 reaches and 8 wetlands. Only the primary streams and most common Community Types are given in the table.

**Table 6. Riparian Community Types**

| Abbreviation | Community Type |
|---|---|
| CARAQU | Water sedge (*Carex aquatilis)* |
| CARUTR | Beaked sedge (*Carex utriculata)* |
| DESCES | Tufted hairgrass (*Deschampsia caespitosa*) |
| ELEPAL/HORJUB | Common spikerush/foxtail barley (*Eleocharis palutrus/ Hordeum jubatum)* |
| JUNBAL/CARPRA | Baltic rush/Clustered field sedge (*Juncus balticus/Carex praegracilis)* |
| PICEA/CORSTO | Spruce/Red-osier dogwood (*Picea engelmannii/Cornus stolonifera)* |
| PICEA/EQUARV | Spruce/Common horsetail (*Picia engelmannii/Equisetum arvense)* |
| PICEA/GALTRI | Spruce/Sweetscented bedstraw (*Picea engelmannii/Galium triflorum* |
| POPANG/HERB | Narrowleaf cottonwood/Herbaceous (*Populus angustifolia*) |
| POTFRU/DESCES | Shrubby cinquefoil/Tufted hairgrass (*Potentilla fruticosa/ Deschampsia caespitosa)* |
| SALEXI | Sandbar willow (*Salix exigua*) |
| SALGEY/CARUTR | Geyer's willow/Beaked sedge (*Salix geyeriana/Carex utriculata)* |

## Analysis and Recommendations

**Procedure to determine conformance with Standard**

Streams within the boundaries of the Centennial Valley Watershed Assessment Area were assessed during the 2004 field season. This was done on a reach by reach basis, according to the methodology presented in Interagency Technical Reference TR 1737-15 "A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas (1998) and TR 1737-16, "A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas". The PFC methodology is a qualitative assessment used by an ID team to interpret riparian health indicators.

The PFC methodology assesses the condition of the vegetation, hydrologic function, and erosion/deposition characteristics. The type, composition and vigor of the vegetation associated with the stream or wetland affects its ability to stabilize stream banks. Hydrologic function and erosion/deposition characteristics assess physical aspects of the stream channel. A stream channel has a particular dimension, pattern and profile in association with its landscape position and geology. Various riffles, runs, pools and glides result from the dimension, pattern, and profile of a stream reach. A properly functioning stream transports its sediment load without excessive erosion or deposition.

To aid the ID Team in the assessment process, available quantitative monitoring data was utilized. Previously established and monitored riparian cover board plots (1980's) and Montana Riparian Wetland Association Inventories (1990's) were re-read by BLM personnel during the summer of 2004 to monitor riparian species cover, composition and regeneration. This data was

summarized and used to help in completing the qualitative PFC assessment. The ID team walked many of the stream reaches within the watershed, and then completed the PFC assessment. For those few stream reaches that were not visited during 2004, previously gathered inventory and monitoring data was used to complete the assessment.

**Findings and Analysis of Riparian Health**

An allotment may be found not meeting the riparian standard even though some reaches within the allotment are in PFC or FAR with an upward trend or may be found to be meeting the riparian standard even though some reaches are FAR with a static trend. The assessments are done on an allotment basis, since management changes are generally implemented on an allotment basis. Table 7 indicates the results of the assessment on an allotment basis.

**Table 7. Allotments, Stream Miles and Condition**

| Allotment | Miles / Acres PFC/FAR(upward trend) | Miles / Acres NF/FAR(static, down, not apparent) |
|---|---|---|
| Bean Creek | 5A | |
| Brundage Bridge | | 5A, 1.1M |
| Brundage Creek | | 3A |
| Cocanougher I | 0.5M | |
| Curlew | 16A, .8 M | 12A[1] |
| Davis SGC | 4 M | |
| Duff Creek | 10 M | |
| East Clover | 0.6 M | |
| Fish Creek | 1.8 M | 2.6 M |
| Jones SGC | 5 A | |
| Lima Reservoir | 2.9 M | 266 A[1], 0.6 M |
| Mata-Stib | 0.4 M | |
| Monida Hill | 3.8 M | 73 A[1] |
| Morton Indiv. | 3.9 M | |
| Mud Lake | 30 A | |
| Munday Reservoir | 0.5 M | |
| Oxbow | 9.8 M, 1 A | |
| Passmore SGC | 5 A | 0.5 M |
| Phalarope East | | 7.9, 89A[1] |
| Price Creek | 39.1M, 200A | 36 A[1] |
| Red Rock | 1 M | |
| Ritchie SGC | 30 A | |
| Rody Individual | | 10A[1] |
| Shineberger | 0.8 M | |
| Tom Creek | 2.3 M | |
| 7 L SGC | 1.1 | |

[1] Lima Reservoir Shoreline Reach

[2] Centennial Valley Wetlands. Drought related impacts.

Resource concerns observed by the ID Team included some or all of the following: alteration of stream morphology (channel shape and gradient), composition, cover, structure and vigor of streamside vegetation, excessive sediment and/or conifer encroachment. The ID team identified

two primary causes of riparian/wetland resource concerns in the assessment area over which the BLM has no control. These causes are irrigation diversions and operation of Lima Dam (extreme fluctuations of water levels). The long term drought is also negatively impacting riparian and wetland resources throughout the watershed. The drought is having visible impacts (drying) on the streams and wetlands, primarily in the valley bottom. Table 8 lists the allotments within the watershed where most riparian and wetland areas within the allotment rated NF or FAR with a downward, static or not apparent trend and generally describes the resource concerns.

**Table 8. Resource Concerns in Riparian and Wetland Areas**

| Allotment | Hydrology: Channel Form and Process | Vegetation: Composition, Cover, Vigor | Erosion/Deposition: Sediment Transport, Upland Erosion |
|---|---|---|---|
| Brundage Bridge | Reduced Bank Stability | Insufficient sedge cover, altered composition | Increased sediment, impaired sediment transport |
| Brundage Creek | Altered width/depth ratio | Altered composition | Increased sediment due to reduced bank stability, impaired sediment transport |
| Fish Creek (Metzel Cr. & lower reach of Fish Creek) | Altered width/depth ratio | Decadence of willows; Altered Composition | Increased sediment due to reduced bank stability, impaired sediment transport |
| Passmore | Altered width/depth ratio | No concerns noted | Increased sediment due to unstable banks, impaired sediment transport |
| Phalarope East | Excess hummocking (pugging) causing drying of wetland area | Altered composition | Increased sediment in stream reaches due to unstable banks. |

**Recommendations for Riparian Health**

1. Develop or revise AMPs on the Brundage Bridge, Brundage Creek, Fish Creek, Passmore and Phalarope East Allotments. Changes in timing, duration, frequency and/or intensity of grazing should be considered to allow these streams to improve. Rest and/or deferment should be incorporated into these allotments. Salting locations, herding, and/or applicable range improvement projects should be examined to determine how these tools can be used to mitigate resource concerns.

2. Address site specific concerns as needed on allotments in which the riparian areas are generally healthy or improving.

3. Implement management measures that will improve streambank stability and increase willow and sedge cover where these concerns were identified.

4. Mitigate conifer encroachment into riparian areas where it was a noted resource concern.

5. Work with BLM engineers on road maintenance to reduce sediment inputs and floodplain fill from current grading practices, primarily on the Price Creek Allotment.

## Water Quality

Western Montana Standard #3: *"Water quality meets State standards"*

### Affected Environment

See Riparian and Wetland Areas section above.

### Analysis and Recommendations for Water Quality

**Procedure to determine conformance with Standard**

The State of Montana's Department of Environmental Quality (DEQ) is responsible for making Beneficial Use Support determinations through a formal process known as Sufficient Credible Data. The BLM does not make Beneficial Use determinations. The BLM works with DEQ providing information in support of these determinations. There are some parallels between DEQ's use of Sufficient Credible Data and the BLM's Process for Assessing PFC. Some of these parallels include assessment of physical characteristics of the stream channel and floodplain.

Water in Montana is owned by the State of Montana. Montana's DNRC and DEQ are responsible for the regulation and use of the water resources of the State. The BLM works in partnership with the State in the protection of its waters. The Federal Clean Water Act and the Montana Water Quality and Water Use Acts guide State and Federal Agencies in protecting and restoring State waters. Both the Federal Clean Water Act and the Montana Water Quality Act prohibit degradation of water quality and require restoration of degraded waters for the protection of beneficial uses.

In addition to the 303(d) list of impaired streams, the ID team used a combination of assessment methodologies to evaluate the watershed characteristics and the stream systems. Upland and riparian assessments were used to determine where BLM management is affecting water quality. Riparian indicators show where some stream channels are negatively impacted by conifer encroachment, channel alteration, condition of riparian vegetation, historic mining, abandoned beaver dams, road maintenance or grazing.

**Findings for Water Quality**

Montana DEQ conducts ongoing water quality assessments and reporting on a watershed basis using watershed units and unit codes developed by the USGS. The USGS hydrologic unit system has multiple levels. DEQ assesses its watersheds at the fourth level. Centennial Valley lies within one of those fourth level units, the Red Rock unit (10020001).

Montana DEQ has published the 2004 Water Quality Report which reflects the results of assessments conducted by the Montana DEQ through December 2003 and includes a planning schedule through 2006. The 2004 Water Quality Report lists lakes and streams which are not supporting their designated beneficial uses along with probable sources and causes of

impairment. The Red Rock watershed has not yet been assessed by DEQ and is not included in the 2004 through 2006 planning cycle; however fourteen streams and two lakes (Upper and Lower Red Rock Lake) within the Centennials Assessment are on the impairment list. For the majority of these streams, the DEQ indicates that they have insufficient data to make beneficial use assessments. Streams in this category on BLM lands include: Bean Creek, Corral Creek, East Fork of Clover Creek, Fish Creek, Hell Roaring Creek, Jones Creek, Long Creek, Peet Creek, Price Creek, and Tom Creek. There are two water bodies on BLM lands for which at least limited data is available, Odell Creek and Red Rock River from Lower Red Rock Lake to Lima Dam. The portion of Odell Creek on BLM land is located within the Centennial Valley Wilderness Study Area.

**Analysis of Water Quality**

The major drainage within watershed study area is Red Rock Lake and River system. There are numerous smaller drainages, for example Price Creek, Jones Creek, Curry Creek, on the south side and Long Creek, Metzel Creek and Wolverine Creek on the north side. Not all portions of the Centennial Valley Watershed are covered under this assessment.

Montana DEQ has Sufficient Credible Data for Odell Creek and has determined that Agricultural, Industrial and Drinking Water Supply uses are fully supported. Aquatic life, Cold Water Fisheries and Primary Contact (recreation) uses are not supported and a Total Maximum Daily Load (TMDL) is required. The identified probable cause of these impairments is severe erosion and sedimentation. Soils are identified as unstable and a threat to aquatic life. Probable cause is identified as severe erosion from grazing and agriculture. The BLM does not authorize grazing in the Odell Creek drainage. The ID team identified fill within the channel and floodplain associated with the historic mining road as a source of impairment to the function of Odell Creek.

For Red Rock River between Lower Red Rock Lake and Lima Dam, Montana DEQ has Sufficient Credible Data to make Use Support determinations for Drinking Water and Agriculture and those uses are fully supported. Sufficient Credible Data is not available to make beneficial use determinations for Aquatic Life, Cold Water Fishery or Primary Contact (recreation).

**Recommendations for Water Quality**

1. Water quality and beneficial use will be examined when DEQ completes watershed based Water Quality Restoration Plans (WQRP) and TMDLs. Any information that BLM has will be made available to Montana DEQ to assist in the development of the WQRP. BLM will work cooperatively to develop and implement these plans.

# Air Quality

## Western Montana Standard #4: *"Air quality meets State standards"*

### Affected Environment

Air quality in the Centennial Valley is excellent. The closest Ambient Air Quality monitoring site to the Assessment Area is located south of the area administered by the Dillon Field Office

in Idaho Falls. Butte is the closest Montana State Particulate Matter (PM) 10 Non-attainment Area. A PM 2.5 emission is a pollutant level of concern and the State of Montana is charged with developing a strategy to address PM 2.5 emissions. Most PM 2.5 emissions are generated by fire.

The 1977 Amendments to the Clean Air Act resulted in the development of Air Quality Classes under the provisions of Section 160, Prevention of Significant Deterioration. The majority of the Centennial Valley watershed is Class II, while the Red Rock Lakes National Wildlife Refuge is Class I.

## Analysis and Recommendations for Air Quality

**Procedure to determine conformance with Standard**

The Clean Air Act of 1990 as amended (42 U.S.C. 7401 et seq) requires the BLM to protect air quality, maintain Federal and State designated air quality standards, and abide by the requirements of the State Implementation Plans.

The Environmental Protection Agency has delegated the authority to implement the provisions of the Clean Air Act to the State of Montana. Determination of compliance with air quality standards is the responsibility of the State of Montana. All of southwest Montana is in attainment, meaning that the air resource meets or exceeds all National Ambient Air Quality Standards.

**Findings for Air Quality**

The Air Quality Standard is met throughout the Centennial Valley Watershed Assessment Area.

**Analysis of Air Quality**

Air quality issues in the planning area center mainly around smoke. Smoke contributors in the planning area include wildfire, prescribed fires, private debris burning, agricultural burning, slash burning, and wood burning stoves and fireplaces. Wildfire can produce short-term adverse effects on air quality. Air quality and visibility can deteriorate due to temporary air stagnation during wildfire events, which are most common during the months of July, August, and September. Concerns regarding human health revolve around smoke from wildland and prescribed fire.

The 1998 Interim Air Quality Policy for Wildland and Prescribed Fires requires states to develop smoke management plans. The Montana/Idaho Airshed Group developed the Montana/Idaho Smoke Management Program. Prescribed burning is done in accordance with the Montana/Dakotas Fire Management Plan and is coordinated with MT DEQ and the Montana/Idaho Airshed Group. During prescribed fire season, the Smoke Monitoring Unit supports the Montana/Idaho Airshed Group to prevent or reduce the impact of smoke on area communities–especially when that smoke could contribute to a violation of national air quality standards. During the summer wildfire season, the Smoke Monitoring Unit assists state and local governments in monitoring smoke levels and providing information about smoke to the public, firefighters, and land managers.

**Recommendations for Air Quality**

1. Continue to monitor smoke during prescribed and wildfire season.

# Biodiversity

Western Montana Standard #5: *"Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species"*

## Affected Environment

This watershed is comprised of a variety of wildlife habitats with corresponding species. The principal types of wildlife habitats are: grasslands, sagebrush-steppe, riparian, and conifer forests. The predominant habitat is the sagebrush steppe.

**Riparian, Aquatic and Wetland Habitat and Associated Species**

Riparian and wetland habitats comprise of <5% of the analysis area. This habitat extends from the Red Rock River in the valley bottom to higher elevation forested habitat. Wetlands and streams throughout the watershed range in elevations from approximately 6,500 feet to over 8,500 feet. These habitats are generally dominated by willow *(Salix spp.)* or aspen *(Populus tremuloides)* communities along foothill streams, and often represent stringers of habitat extending below forested areas into sagebrush/grassland habitat that is dominated by sedges (*Carex* sp.) and rushes (*Juncus* sp). Aspen communities are scattered along the timbered front on the south side of the valley, many of them being associated with streams and springs. Riparian vegetation communities found in Montana are described in Hansen, et al. (1995) and Cooper, et al. (1995). Riparian and wetland communities around springs, seeps and pothole ponds in sagebrush habitats represent important small islands of habitat diversity as well as crucial water sources.

Riparian habitats receive a disproportionate amount of wildlife use with approximately 75% of all wildlife species in this area utilizing riparian habitat for at least some portion of their annual life cycle. These riparian areas provide essential habitat for moose *(Alces alces)*, elk (*Cervus elaphus)*, beaver (*Castor canadensis)*, sage grouse (*Centrocercus urophasianus*) brood rearing and neo-tropical migrant songbirds

Beaver activity is evident by active and relic dams in most of the perennial streams in the watershed where suitable habitat exists. These habitats are essential to sustain migrant songbirds and amphibian populations.

The Centennial Watershed is unique in that it is the largest wetland complex on public lands managed by the BLM in the Dillon Field Office. All species of ducks are well represented during spring and fall migrations with numbers reaching upwards of 50,000. The wetlands in the valley support ⅓ to ½ of the breeding population of trumpeter swans *(Cygnus buccinator)* in the tri state area of Idaho, Montana and Wyoming. The Red Rock River and associated wetlands also support one of the largest populations of molting Canada geese *(Branta canadenis*) in the northern Rocky Mountains.

Moose have increased in numbers and distribution since the late 1970's. Moose currently occur at least seasonally and in small numbers in all drainages throughout the watershed where dense riparian vegetation is present. Most moose habitat is associated with riparian corridors that extend from the major drainages upward in elevation into conifer forests. At higher elevations in moist forest types, moose use expands out of riparian areas and can occur yearlong and area-wide.

Migratory bird inventories have been conducted informally by documenting occurrences within the watershed. The Partners in Fight Bird Conservation Plan for Montana was prepared "to focus on restoring healthy ecosystems that will sustain productive and complete bird communities" (Montana Partners in Flight, 2000), and identified 141 species for priority status in five habitat groups. Most of these birds are summer residents that use habitats ranging from lower elevation wetlands to high elevation forests for breeding and raising young. Some species are migratory but small populations may be present yearlong depending on seasonal conditions. The USFWS has also identified a list of 28 "Birds of Conservation Concern" for the Rocky Mountain Region, 12 of which occur within the analysis area during part or all of the year (see Table 9).

**Table 9. USFWS Birds of Conservation Concern that occur within the watershed.**

| | |
|---|---|
| Swainson's hawk | Ferruginous hawk |
| Golden eagle | Peregrine falcon |
| Prairie falcon | Loggerhead shrike |
| Brewer's sparrow | Long-billed curlew |
| Upland sandpiper | Solitary Sandpiper |
| Red-naped sapsucker | Wilson's Phalarope |

**Fish Streams**

There are 16 streams supporting fisheries within the assessment area. These streams are shown on Map 3. Westslope cutthroat trout *(Oncorhynchus clarki lewisi)* (WCT), arctic grayling (*Thymallus arcticus*), mountain whitefish (*Prosopium williamsoni)*, mottled sculpin (*Cottus bairdi*), longnose sucker (*Catostomus catostomus*), white sucker (*Catostomus commersoni*), long nose dace (*Rhinichthys cataractae*) and burbot (Lota lota) are endemic fishes in the Centennial Watershed. Rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*) and Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*) were introduced, probably about the turn of the century to several streams and the Red Rock Lakes.

All native species are present within the watershed at varying levels, with the exception of fluvial arctic grayling which have been extirpated from the Red Rock River. Bear Creek still supports 100% pure WCT. Additionally, there are three streams that support slightly hybridized WCT populations and five streams that support WCT with unknown genetic purity.

WCT were historically widespread throughout streams in western Montana. Genetically pure WCT are primarily restricted to limited habitats within headwaters of tributary streams where they occur in the Missouri River basin. It is estimated that WCT are genetically unaltered in only 2.5% (McIntyre and Reiman 1995) to 10% (Shepard et al. 2002) of their historical range.

Many of these small populations have a high risk of extinction due to isolation and threats from hybridization. There are currently 9 streams that support WCT on BLM-administered lands being addressed in this evaluation (see Table 10). The percent genetic purity of WCT is shown in parentheses in Table 10.

The portion of the Red Rock River on BLM immediately below Lima Dam along with portions of Price, Fish, Wolverine, Tom, Shambo, Hell Roaring and Corral Creeks were assessed for rangeland health standards.

**Table 10. Fish Species Present**

| Stream | Fish Species Present |
|---|---|
| **Red Rock River** (below Dam) | Rainbow trout, cutthroat trout hybrids and brown trout, long nose and white sucker, mottled sculpin, long nose dace, mountain whitefish. |
| **Red Rock River** (above Lima Reservoir) | Mottled sculpin, longnose sucker, white sucker |
| **Lima Reservoir** | Burbot, mottled sculpin, longnose sucker, white sucker |
| **Wolverine Creek** | Brook trout |
| **Corral Creek** (east end) | Brook trout |
| **Price Creek** | WCT (97 %) |
| **Jones Creek** | WCT (97%), mottled sculpin, long nose dace |
| **Bean Creek** | WCT (98%) |
| **Bear Creek** | (WCT 100%) |
| **Shambow Creek** | Brook trout |
| **Odell Creek** | WCT (unknown %), brook trout, mottled sculpin |
| **Tom Creek** | Brook trout, WCT (unknown %) |
| **Hell Roaring Creek** | Brook trout, WCT (unknown %) |
| **Corral Creek** (east end) | Brook trout |
| **Fish Creek** | Brook trout |
| **West Creek** | WCT (unknown %) |
| **Middle Creek** | WCT (unknown %) |

**Conifer Forest Habitat and Associated Species**

Forested habitats comprise approximately 33% of the watershed, most of which lies along the south side of the valley in the Centennial Mountains. The close association of much of this forested habitat with adjoining sagebrush and riparian habitats supports a broad array of wildlife species. This habitat provides essential linkage corridors for grizzly bears *(Ursus arctos horribilus),* Canada lynx (L*ynx canadensis*), gray wolf *(Canis lupus)* and other large carnivores. It also provides security habitat for big game species and migration corridors between seasonal habitats.

Higher elevation lodgepole/spruce/subalpine fir forest provides summer habitat for mule deer *(Odocoileus hemionus)* and elk, and yearlong habitat for moose and large carnivores. Most wildlife species utilizing this habitat are seasonally migratory or have adapted to cope with significant winter snowfall accumulations.

Mid-elevation forests dominated by Douglas-fir provide a wider array of habitat that is generally drier and more available throughout the year. The dry Douglas-fir habitat types have expanded in recent history, increasing in density and enlarging existing stands by pioneering into adjacent sagebrush habitats.

**Sagebrush Habitats and Sagebrush Dependent Species**

Big sagebrush habitat types are the dominant vegetation communities comprising 41% of public lands in the analysis area. This area supports a significant diversity of sagebrush species and communities, and sagebrush-dependent wildlife species. At mid to lower elevations, mountain big sagebrush and three tipped sagebrush is the dominant habitat type that provides important summer habitat for mobile wildlife species such as mule deer, pronghorn antelope *(Antilocapra Americana)*, and sage grouse, and localized yearlong habitat by sagebrush-obligate species such as pygmy rabbit *(Brachylagus idahoensis)*. Intermingled occurrences of basin big sagebrush and Wyoming big sagebrush, low sage and greasewood add to the diversity of vegetation and habitat structure. At higher elevations, moist mountain big sagebrush communities provide elk calving and sage grouse brood-rearing habitat along with dispersed spring, summer and fall habitat for numerous other species, often in association with forested habitat. Mixed sagebrush communities and localized dominance by other sagebrush species on specific sites within the broader sagebrush types often support uniquely dependent wildlife uses, such as pygmy rabbits.

Due to the regional losses of sagebrush communities, and the dependent wildlife uses, maintenance and improvement of existing sagebrush habitat is important. Ongoing conservation efforts emphasize the importance of maintaining the integrity of mid- to late-seral sagebrush habitats on public lands, particularly for antelope, mule deer, pygmy rabbit and sage grouse.

Sage grouse populations and sagebrush habitat are issues for public land management due to significant habitat losses range-wide due to habitat fragmentation from conversion for agriculture, urbanization, conifer encroachment, wildfire and prescribed fire, and livestock grazing.

Important seasonal sage grouse habitats are centered on breeding and winter complexes. Nesting usually occurs within 2 miles of the lek, where suitable habitat is available. Brood rearing habitats require a mix of forbs and insects for a high protein diet, usually in association with riparian habitats. Winter diets consist of almost 100% sagebrush. The Dillon RMP, when finished, will provide management direction for sagebrush habitat on public lands. The RMP has incorporated the *Management Plan and Conservation Strategies for Sage Grouse in Montana* drafted by the Montana Sage Grouse Work Group.

**Table 11. Habitat use by primary game species**

| Species | Forested | Sagebrush | Riparian |
|---|---|---|---|
| Antelope | | S,C | |
| Elk | S,C | W,C | Y |
| Moose | Y | Y | Y |
| Mule deer | S,C | W,C | W |
| Sage grouse | S | Y | B |
| Blue grouse | Y | | Y |

Y=yearlong, W=winter, S= summer, C=calving/fawning, B=breeding/brooding

**Special Status Species**

Special Status Species include: Federally Listed Threatened and Endangered Species and Designated Critical Habitats, Federally Proposed Species and Proposed Critical Habitats, Candidate Species, State Listed Species, and BLM Sensitive Species (BLM Manual 6840).

**Special Status Fish**

WCT are a designated Sensitive species for the BLM and USFS, and have been listed as a Class A State Species of Special Concern by the Montana Department of Fish, Wildlife and Parks (MFWP) and the Montana Chapter of the American Fisheries Society since 1972. Class A designation indicates limited numbers and/or limited habitats both in Montana and elsewhere in North America; elimination from Montana would be a significant loss to the gene pool of the species or subspecies. WCT were petitioned for listing under the Endangered Species Act (ESA) and found "not warranted" by the USFWS in 2002. A court ordered review of that decision in 2003 again found them "not warranted". In Oct 2004 the USFWS received a 60 day notice of intent to sue based on hybridization levels and current status of WCT in its native range.

In May of 1999, the BLM entered into a Memorandum of Understanding (MOU) and Conservation Agreement (Agreement) with the MFWP, USFWS and the USFS. The purpose of the MOU and Agreement is to expedite conservation measures for WCT in Montana through a collaborative and cooperative effort among resource agencies, conservation and industry organizations, resource users, and private land owners. Threats to the WCT and its habitat should be significantly reduced or eliminated through implementation of this Agreement.

The management goal for WCT in Montana is to ensure the long-term self-sustaining persistence of the subspecies within each of the five major river drainages they historically inhabited in Montana (Clark Fork, Kootenai, Flathead, upper Missouri, and Saskatchewan), and to maintain the genetic diversity and life history strategies represented by the remaining local populations.

**Special Status Plants**

Currently eight sensitive plant species inhabit BLM lands in the Centennial Valley. Suitable habitat for two additional sensitive species, (Northwestern Theylpody and Alkali Primrose) occurs in the valley, but at present time theses two species are known only from historic records. BLM Sensitive plants are shown in Table 12.

**Table 12. BLM Sensitive Plant Species**

| Common Name<br>Genus species | Habitat |
|---|---|
| Painted Milkvetch<br>*Astragalus ceramicus var apus* | Sparsely vegetated sand dunes |
| Railhead Milkvetch<br>*Astragalus terminalis* | Sagebrush steppe and grasslands |
| Idaho Sedge<br>*Carex idahoa* | Moist meadows around seeps, ponds, or streams, usually associated with calcareous soils |
| Sand Wildrye<br>*Elymus flavescens* | Sparsely vegetated sand dunes |
| Beautiful Bladderpod<br>*Lesquerella pulchella* | Gravelly, calcareous soils in mountain mahogany and limber pine woodlands |
| Pale Evening-primerose<br>*Oenothera pallida var idahoensis* | Sparsely vegetated sand dunes |
| Whipple's Beardtongue<br>*Penstemon whippleanus* | Open, often rocky soil of dry meadows in the subalpine and alpine zones |
| Alpine Meadowrue<br>*Thalictrum alpinum* | Moist, alkaline meadows |
| Northwestern Thelypody<br>*Thelypodium paniculatum* | Wet, often alkaline meadows |
| Alkali Primrose<br>*Primula alcalina* | Moist alkaline meadows |

**Threatened and Endangered Species**

*Bald Eagle*

Bald Eagles (*Haliaeetus leucocephalus*) are known to nest in the Centennials. Large bald eagle winter concentrations occur along the Red Rock River in areas where open water and prey are available. Cooperative interagency monitoring is occurring through the Montana Bald Eagle Management Plan. Recovery efforts for bald eagle and restrictions around nests have had little effect on current land use authorizations. Bald eagles are currently proposed for delisting.

*Grizzly Bear*

Public lands administered by the Dillon Field Office are outside the Yellowstone grizzly bear Recovery Zone. The Yellowstone Recovery Zone includes a portion of the Targhee National Forest to the south and east. Critical habitat has not been designated; however about 90% of the watershed has been designated as grizzly bear distribution habitat outside the Yellowstone Recovery Zone. The greatest benefit that public lands provide for grizzly bear may be in providing secure habitat and protection as travel corridors between recovery zones. Grizzly bear occurrences have increased in the past years and are expected to rise in the future. A Montana state management plan is being developed that would direct future grizzly bear management if delisting occurs.

*Gray Wolf*

Prior to the reintroduction of nonessential experimental wolf populations in Yellowstone and central Idaho ecosystems in 1994, gray wolves were classified as endangered with the full protection of ESA. Under the reintroduction rules, wolves that are within the reintroduction area but are not within a national park or national wildlife refuge are treated as a "proposed threatened" species, rather than endangered, for Section 7 consultation purposes. Therefore wolves occurring within the watershed are outside of the primary recovery zone, and are considered as non-essential experimental populations. Widespread occurrences outside of primary recovery zones within the watershed have continued to increase. Wolf-livestock conflicts will generally result in removal or relocation of offending wolves and may preclude the potential establishment of stable packs within the watershed. A Montana state management plan is being developed to direct wolf management after delisting.

*Canada Lynx*

Potential lynx habitat has been identified cooperatively with Beaverhead-Deerlodge NF using existing vegetation data to identify moist forest habitat types. Potential lynx habitat on public lands is generally peripheral to more extensive habitat areas on USFS lands, with the only extensive habitat available on BLM lands occurring in the Centennial Mountains. Similarly, small stands of forested habitat that meet vegetation criteria are mapped as potential lynx habitat but are too small to support anything other than temporary transient use. No inventory efforts have been conducted on BLM lands. The Lynx Conservation Assessment and Strategy (2000) provides programmatic and project-level management guidelines for lynx conservation and is the basis for consultation determinations for all proposed projects.

**Table 13. Special status wildlife species within the watershed.**

| Special Status Species that are known or suspected to occur in the Watershed | Current BLM Management Status of the Species | Occurrence within the watershed Resident * (R) Transient (T) | Preferred habitat |
|---|---|---|---|
| Bald Eagle (*Haliaeetus leucocephalus*) | Threatened (MT); up for delisting | R | Riparian/wetland |
| Canada Lynx (*Lynx canadensis*) | Threatened | T | Forest |
| Gray Wolf (*Canis lupus*) | Threatened, experimental pop. | R | All |
| Grizzly Bear (*Ursus arctos horribilus*) | Threatened (MT) | T | Forest |
| **Amphibians** | | | |
| Boreal/Western toad (*Bufo boreas*) | Sensitive | R | Riparian/wetland/forest |
| **Birds** | | | |
| Black-backed Woodpecker (*Picoides arcticus*) | Sensitive | R | Forest |
| Black Tern (*Chlidonias niger*) | Sensitive | R | Wetland |
| Burrowing Owl (*Athene cunicularia*) | Sensitive | T | Grassland |

| Special Status Species that are known or suspected to occur in the Watershed | Current BLM Management Status of the Species | Occurrence within the watershed Resident * (R) Transient (T) | Preferred habitat |
|---|---|---|---|
| Common Loon (*Gavia immer*) | Sensitive | T | Wetland |
| Canvasback duck (*Aythya valisneria*) | Sensitive | R | Wetland |
| Ferruginous Hawk (*Buteo regalis*) | Sensitive | R | Sagebrush shrubland |
| Flammulated Owl (*Otus flammeolus*) | Sensitive | R | Forest |
| Franklin's Gull *(Larus pipixcan)* | Sensitive | R | Riparian/Wetland |
| Great Gray Owl (*Strix nebulosa*) | Senstive | R | Forest |
| Hairy woodpecker (*Picoides villosus*) | Sensitive | R | Forest Riparian/wetland |
| Harlequin Duck (*Histrionicus histrionicus*) | Sensitive | T | Riparian/wetland |
| Loggerhead Shrike (*Lanius ludovicianus*) | Sensitive | R | Sagebrush shrubland |
| Long-billed Curlew (*Numenius americanus*) | Sensitive | R | Grassland |
| Northern Goshawk (*Accipiter gentilis*) | Sensitive | R | Forest |
| Peregrine Falcon (*Falco peregrinus anatum*) | Sensitive | R | Riparian/wetland |
| Sage Grouse (*Centrocercus urophasianus*) | Sensitive | R | Sagebrush shrubland |
| Sage Sparrow (*Amphispiza belli*) | Sensitive | R | Sagebrush shrubland |
| Swainson's Hawk (*Buteo swainsoni*) | Sensitive | R | Riparian/wetland Sagebrush shrubland |
| Three-toed Woodpecker (*Picoides tridactylus*) | Sensitive | R | Forest |
| Trumpeter Swan (*Cygnus buccinator*) | Sensitive | R | Riparian/wetland |
| White-faced Ibis (*Plegadis chihi*) | Sensitive | R | Wetland |
| Willet *(Cataptrophorus semipalmatus)* | Sensitive | R | Wetland |
| Wilson's phalarope *(Phalaropus tricolor)* | Sensitive | R | Wetland |
| **Fish** | | | |

| Special Status Species that are known or suspected to occur in the Watershed | Current BLM Management Status of the Species | Occurrence within the watershed Resident * (R) Transient (T) | Preferred habitat |
|---|---|---|---|
| Adfluvial arctic grayling (*Thymallus arcticus*) | Sensitive | R** | Riparian/wetland |
| Westslope cutthroat trout *(Onchorhynchus clarkii lewisi)* | Sensitive | R | Riparian/wetland |
| **Mammals** | | | |
| Fisher (*Martes pennanti*) | Sensitive | R | Forest |
| Great Basin pocket mouse *(Perognathus parvus)* | Sensitive | R | Sagebrush shrubland |
| North American Wolverine (*Gulo gulo luscus*) | Sensitive | R | Forest |
| Pygmy Rabbit (*Brachylagus idahoensis*) | Sensitive | R | Sagebrush shrubland |
| Townsend's Big-eared Bat (*Corynorhinus townsendii*) | Sensitive | T | Forest |

*Resident includes migratory species that fulfill a portion of their life history here.
** Occurs within the watershed but not known to currently occupy BLM administered streams.

## Analysis and Recommendations for Biodiversity

**Procedure to determine conformance with standard**

This standard is an overall assessment of biodiversity and wildlife habitat. The present state of each allotment and habitat type was compared to the natural and historic condition. The indicators described under the S&G definition of the standard were used to determine if this standard was met. The condition/function of the other standards, specifically uplands and riparian, were considered to determine whether or not Standard #5 was met.

We considered the range of natural variation within this ecosystem as well as the species composition, condition of available habitat, and forest health to determine if optimal biodiversity is being achieved. The wildlife habitat niches expected are: grasslands (short and mid grasses), bare ground, small streams, riparian/wetlands, sagebrush steppe, conifer forests, aspen stands, and various mixes of these components. Providing habitat for special status plant and animal species is key to meeting the biodiversity standard.

**Findings for Biodiversity**

The watershed has large blocks of land in native vegetative cover adjacent to each other to maintain connections or corridors with other similar habitats. The relatively limited change from the historic native state is evidenced by species richness, vigor and diversity of plants and animals in the watershed.

Throughout the watershed area, most habitats are still relatively intact and functioning, however some native wildlife species may be absent or present in diminished numbers (e.g., bison, gray

wolf, native trout), and important ecological processes have been altered (e.g., fire frequency and intensity, beaver dams). A few upland habitats exhibit changes in species composition outside what is expected for those sites. Non-native species (e.g., spotted knapweed, houndstongue, cheatgrass) have increased, and these noxious weeds have replaced natives. Other non-native species (e.g., Kentucky bluegrass, timothy) have been introduced and replaced natives. These non-native species perform various roles from beneficial to detrimental, but are not always fully understood in the present day functioning of the ecosystem. Due to the lack of fire over the past 120 years, conifer expansion has occurred throughout the watershed. This has reduced aspen, willow and sagebrush steppe habitats and changed forest density and structure. This is reported in detail below under Forest Health and Fuels. These altered habitats, disturbance regimes and processes have an impact on the overall biodiversity.

Biodiversity was found to be outside the "natural range of variability" on nine allotments and the unleased tracts along the south side of Centennial Valley. Forest health was FAR with a downward trend within the Price Creek, Shambo Units, Peet Creek, Duff Creek AMP, Tom Creek and Fish Creek Allotments and the unleased tracts impacting biodiversity of these areas. Within the Phalorope East, Brundage Bridge, and Fish Creek Allotments, riparian and/or upland concerns as reported above impacted biodiversity and habitat needs.

Biodiversity and habitat conditions were found to be within the natural range of variation within the remainder of the watershed.

**Analysis of Biodiversity**
**Riparian/Wetland Habitat**
Conifer expansion into riparian areas within the higher elevations and along benchland areas on the south side Centennial Valley has greatly reduced aspen and willow habitat. Aspen and willows along these riparian zones are mostly decadent or dead stands intermingled with Engelmann spruce or Douglas- fir. This was documented specifically within the Price Creek, Peet Creek, Shambo Units, Duff Creek AMP and Tom Creek Allotments and the unleased tracts between Duff Creek and Tom Creek.

Historically, beaver have had a keystone role in creating and maintaining riparian habitat and associated wetlands. Suitable habitat to sustain beaver colonies may be significantly affected by the loss of aspen throughout the watershed. Historic beaver activity was noted on almost all drainages, and many large beaver complexes exist within the watershed, but very little current activity was noted. Managing to improve or increase the woody riparian habitat benefits all riparian associated species, including amphibians and fish.

The Red Rock River corridor between Lima Reservoir and Red Rock Lakes National Wildlife Refuge provides waterfowl nesting habitat and supports 15 – 20 active nesting territories for trumpeter swans. These nesting territories are located on the Cocanougher, Oxbow, Brundage Bridge and 7L SGC allotments. With the exception of Brundage Bridge, these allotments are meeting the riparian and biodiversity standard. The majority of this allotment is private, but has the potential to provide quality nesting cover for all waterfowl. The territories are scattered on public lands, private and State lands. This emphasizes the importance to build partnerships to

benefit management objectives for all parties involved. Lima Reservoir also supports a non-breeding population of about 100 trumpeter swans during the molting season. Molting is usually completed by June. Canada geese population peaks at about 15,000 during the molting season in mid-June as well.

Permanent nest abandonment has been documented from human disturbance (Henson and Grant 1991). Disturbance from livestock grazing may affect nesting success as well. Trumpeter swans are most sensitive to disturbance from mid-April to mid-June during nesting and molting. Deferring grazing activity until after the nesting season can reduce nest disturbance and abandonment.

The watershed receives extensive spring and fall migrant waterfowl use, with numbers reaching up to 50,000 birds, including 3,000 Tundra swans. Duck production is limited by fluctuating water levels in Lima Reservoir and residual vegetative cover during early nesting season. Waterfowl nesting plots were established in the 1980's and re-read in the spring of 2004. Many of the Lima Reservoir shoreline plots documented unsuitable nesting cover due to drought conditions and continued grazing during this period. Much of the nesting cover in the valley consists of foxtail barley due to long term drought, which is not the preferred species, but provides hiding cover or the same forage values for waterfowl. The waterfowl cover studies east of Lima Reservoir on Red Rock River showed a more desirable community of *Juncus* and *Carex* species. A management concern noted was the current use on the Price Creek allotment along the south side of the reservoir. In 1998 a fence was constructed to improve waterfowl nesting cover, but livestock continue to access the south side of the reservoir from Lima Reservoir allotment to the north.

Streams within the assessment area generally do not support popular recreational fishing. The Red Rock River below Lima Dam supports a moderate sport fishery for hybrid cutthroat, rainbow trout and an occasional brown trout. Hell Roaring and Odell Creeks support a limited fishery for trout, mostly brook trout, supporting 62 and 42 angler days per year respectively. Wolverine Creek is locally popular with some anglers pursuing relatively abundant brook trout.

Fish habitat conditions on streams within the watershed range from fair to excellent with the best habitat usually found in the upper reaches. Impacts to fish habitat include livestock use, drought, wildland fire, roads and road maintenance, stream dewatering and a dam.

Studies have shown that degraded habitat has caused declines in cutthroat trout abundance followed by invasion of non-natives, especially brook trout (Griffith 1972).WCT have been found to utilize habitat with higher water velocities (Griffith 1972; Pratt 1984) and water depths deeper than the average available (Brown and Mackay 1995). Cutthroat trout population densities have shown an inverse relationship to streams' width-to-depth ratios (Dunham et al. 2002). Additional studies have shown WCT to have a strong preference and dependence on pool habitats (Shepard 1983; Pratt 1984) and habitats that provide cover (Griffith 1970; Pratt 1984).

Stream bank trampling affects fisheries habitat by compacting the riparian soil and by trampling or shearing the stream banks. Soil compaction leads to less infiltration and an increase in runoff.

More significantly, trampling causes riparian soils to become exposed which leads to increased erosion and an increase in streambed sedimentation (Platts 1990). Several studies have indicated that cutthroat trout reproduction is impacted by increased levels of fine sediment (Ringler and Hall 1975; Irving and Bjornn 1984; Young 1989; Young et al. 1991; Ireland 1993).

Table 8 identifies the primary riparian resource concerns for streams that were found be NF and FAR with a downward, static or not apparent trend. Fish streams that were found to be FAR with a static or downward trend include the Red Rock River within the Brundage Bridge allotment and Fish Creek. Functionality and habitat conditions of other fish bearing streams assessed were found to be meeting standards and were in good or improving condition.

Generally, the current riparian vegetation has a variety of age classes, with the exception of palatable woody species (willow, aspen) in the riparian areas. Most of the riparian areas need more young and mid-age classes of woody species to be optimal. Heavy ungulate browsing and fire exclusion have resulted in aspen clone decadence.

**Conifer Forest Habitat**

Conifer forests are important for big game security cover and migration corridors, and grizzly bear and lynx conservation. Several thousand elk use the Centennial Mountain range for seasonal migration between summer and winter habitat.

Road density management is essential to maintaining suitable grizzly bear habitat and should be limited to less than 1 mile of road per square mile. Currently, road densities are below 1 mile of road per square in the Centennial Mountains and valley. Several grizzly bear sightings have been reported within the watershed near Odell Creek and Alaska Basin. No reproduction has been confirmed and use is considered transient. The Centennials also provide the greatest potential habitat for Canada lynx within lands administered by the Dillon Field Office. Suitable habitat exists; however, occupancy has not been confirmed. The Wildlife Conservation Society, with cooperative funding from the BLM, is currently conducting a study within the watershed to determine occupancy and uses by large carnivores including grizzly bears, lynx and wolves.

The lack of recent fire in much of this habitat has created conditions that support wildlife species dependent on later-seral conditions. Enlargement of timber stands has created improved "linkages" between larger forested blocks of habitat. The "encroachment" along the perimeter and within many of these stands provides a dense, multi-storied security habitat between open sagebrush and tall conifer forest that may be more available now than historically. The increased density creates overcrowding in multistoried stands inhibiting herbaceous understory and aspen regeneration, thereby reducing forage availability for wild ungulates. The resulting habitat conversion to Douglas-fir has reduced forage availability and shrub steppe habitat within the watershed over time.

Forest health within the watershed was found to be FAR with downward trend due to overstocking and epidemic insect infestations. The ID team determined the primary cause is a change in the historic fire disturbance regime, i.e. lack of recent fire. This is discussed further in the Forest Health and Fuels Management section.

**Sagebrush Habitat**
Several endemic sensitive plant species occur within the Sand Dunes Allotment. These sensitive plant species require early seral habitat conditions (moving sand dunes). The conditions found by the ID team were late seral.

Big game winter use studies read on Price Creek allotment in spring 2004 averaged 10% use on bluebunch wheatgrass and 4% on other grass species. The winter use studies are located on the south side of the valley and normally receive higher use on years with low snow pack. The current wintering population of elk in the watershed is around 1500-2000 with several thousand also traveling through the valley during migration to seasonal habitats (pers. comm. Brannon 2004). Several miles of fencing was identified throughout the valley that does not meet BLM specifications, and is inhibiting wildlife movements. Fences were also identified that were partially on the ground and no longer in use. These fences create barriers for wildlife and occasionally result in wildlife entanglement and potential mortality.

Some areas (private land) of the watershed have been cultivated in the past and much of the valley was used for hay production. These areas are irrigated, which has flooded out sagebrush and created native grasslands that are currently used for livestock grazing. The habitat has remained relatively unchanged for the past 50 years, since the majority of the sage grouse lek monitoring has occurred. Lek monitoring has occurred sporadically in the valley since mid-1970 and is used as an index to population size and trend. The Adopt- A- Lek program began with the National Wildlife Federation volunteers and the past few years has provided us with more accurate data. Crowley and Connelly (1996) documented declining numbers of male sage grouse on nearly all leks in southwest Montana since the early 1970s, although some numbers have stabilized or increased slightly since then. MFWP maintains a database documenting lek occupancy and male attendance. There are currently 12 known leks within the watershed. The male counts on the leks have slightly increased in the past few years, with the highest count being in 2004 (pers. com. Brannon 2004).

Habitat characterization data is currently being collected to identify the best suitable nesting habitat for sage grouse. Radio telemetry studies will be implemented in spring 2005 to identify seasonal habitats and migrations. Wintering sage grouse habitat has been identified but the population of wintering grouse is unknown. Several allotments appear to be providing adequate nesting and brood rearing habitat but are showing little evidence of use. Other allotments have been identified for changes in season of use permitted or increased rest to improve residual cover to meet nesting requirements.

Sage grouse using given lek complexes appear to act as discrete population units, at least during the breeding season, with little interchange between groups. However, seasonal movements - distance and duration - vary significantly between groups of sage grouse. Historically large flocks of sage grouse migrated to Idaho during winter, it is speculated, but unknown if these large migrations still occur. Recently sage grouse have been documented using leks in Idaho, summering in Montana, and then migrating back to ID during winter. Connelly (1988) recognized that sage grouse leks are closely associated with winter range.

Pygmy rabbit habitat in the watershed has expanded from what has been previously identified. Inventory efforts have confirmed occupied habitat throughout much of the valley that was previously considered non-suitable or unoccupied. Habitat monitoring efforts have begun to characterize the occupied habitat. There also appears to be adequate habitat for population expansion.

Thirty-two allotments met the biodiversity standard and 9 allotments and the unleased tracts did not. Reasons identified for not meeting the biodiversity standard were: water quality impairments, epidemic insect infestations, increased conifer density, conifer encroachment, altered composition and low vigor of herbaceous vegetation in sagebrush habitats, impacts to wetlands and associated riparian habitats and diminishing willow species and aspen clones.

The plant communities are in a variety of successional stages throughout the watershed. Our goal is to find a balance to meet habitat requirements for species (especially special status species) that need a mosaic of habitats from very short vegetation to dense, tall cover.

**Recommendations for Biodiversity**

1. Mitigate forest health concerns, hazardous fuels conditions and conifer expansion into riparian and sagebrush steppe habitats.

2. Manage threatened and endangered species habitats for recovery and protection (lynx, grizzly bear, gray wolf).

3. Work with MFWP, USFWS, and other partners to manage Westslope cutthroat trout, sage grouse habitat and other special status species, as per Conservation Agreements or State-wide Plans.

4. Initiate a radio telemetry study for sage grouse to characterize seasonal habitats and determine seasonal migrations to Idaho.

5. Prioritize monitoring of sagebrush habitat due to its importance for sage grouse, pygmy rabbits, migratory birds, and wintering big game.

6. Maintain 10% canopy cover of low succession forbs community on mesic sites that occur near brood rearing areas and provide adequate cover to protect nesting sage grouse from predators within identified nesting areas. Implement monitoring of sage grouse nesting habitat per *Management Plan and Conservation Strategies for Sage Grouse in Montana*

7. Develop actions to provide adequate nesting cover for trumpeter swans within known territories.

8. Work with partners to implement trumpeter swan nest monitoring protocol to document reproductive success.

9. Consider a prescribed burning program to maintain some grassland areas free of woody vegetation for grassland birds. Vary grazing pressure by interspersing areas of heavy, light and non-grazing of livestock to provide habitat for a variety of grassland bird species.

10. Develop actions to increase willow regeneration and cover where willow regeneration was a noted concern. Consider implementing browse utilization guidelines to manage livestock upon switching dietary preference from herbaceous to woody species.

11. Consider treatment on decadent aspen stands in areas where we can protect the treatment for the time frame required to maximize chances of meeting objectives (protection fences that will keep livestock, deer, moose and elk out or treatment areas large enough in size to disperse ungulate use). Consider implementing browse utilization guidelines on aspen where browsing was noted as a cause that was preventing recruitment. The guidelines should consider all sources of browsing.

12. Continue noxious weed control program to maintain native plant communities. Spotted knapweed, houndstongue, and other noxious and/or invasive species could have an effect on biodiversity if present weed control program were to be curtailed.

13. Explore control options for cheatgrass, specifically on the south facing slopes along the NW corner of Lima Reservoir.

14. Develop alternatives to provide early seral conditions within the sand dunes to provide habitat for endemic sensitive plant species

15. Develop or revise AMPs for the Phalarope East, Fish Creek and Brundage Bridge Allotments. Changes in timing, duration, frequency and/or intensity of grazing should be considered. Rest and/or deferment should be incorporated into these allotments. Salting locations, herding and/or applicable range improvement projects should also be examined to determine how these tools can be used to mitigate resource concerns.

16. Modify or reconstruct fences that do not meet BLM specifications and inhibit wildlife movements and remove fences that are no longer in use. Coordinate with private landowners to modify BLM/private boundary fences

# Forest Health and Fuels Management

## Affected Environment

### Introduction and Rationale

Evidence of historically recurring fire is found throughout the analysis area in forests and woodlands. Fire exclusion caused primarily by fire suppression and livestock management on rangelands over the last century has changed the structure, density, and plant species composition within forest and grassland communities. Hazardous fuels have increased within areas historically maintained by moderate to high fire frequencies, aspen are declining due to conifer encroachment, and conifer stands have increased densities and are more susceptible to insect and disease outbreaks. High intensity fires are now more likely to occur in areas that

historically experienced low intensity, frequent fires. Due to fuel continuity, fires are also more likely to be of significantly greater size than those which historically occurred. Large scale, high intensity fire presents risks to wildlife security cover, watershed stability, sensitive fish and wildlife species, human life and property.

In fire adapted ecosystems, recurrent fire is the dominant disturbance that affects vegetation patterns. One method to describe this disturbance is by using historical fire regimes (Table 14). The fire regime concept is used to characterize the personality of a fire in a given vegetation type, how often it visits the landscape, the type of pattern created, and the ecological effects. The historical fire regimes for the watershed are arranged based on fire severity and fire frequency.

**Table 14. Historical Fire Regimes**

| Historical Fire Regimes | Severity (% Overstory Replacement) | Fire Interval (Years) | Acres* | Representative Ecosystem |
|---|---|---|---|---|
| NL -- non-lethal | low - <20% | 10 to 25 | 3,635 | Dry pine, conifer encroachment and juniper forests |
| MS1 -- mixed severity, short interval | low - 20-30% | 20 to 40 | 4,260 | Lower Elevation Conifer Forests |
| MS2 -- mixed severity, long interval | mod - 30-80% | 40 to 120 | 15,198 | Shrublands, mixed conifer forests |
| SR1 -- stand replacement, short interval | high - >80% | 95 to 180 | 58,145 | Certain lodgepole pine, dry Douglas-fir forests |
| SR2 -- stand replacement, long interval | high - >80% | 200 to 325 | 0 | High elevation whitebark pine, spruce-fir, and Pacific coastal forests |
| SR3 -- stand Replacement nonforest | high - >80% | <35 | 254,967 | Grasslands, many shrub communities |

* The acreage calculation for each historical fire regime is based on the hydrologic unit scale. They include all ownerships to more accurately describe the current situation. Acreage discrepancies occur through calculations made in GIS.

**Current Condition Classes**

Fire Regime Condition Class (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001), based on a relative measure describing the degree of departure from the historical natural fire regime. This departure is from changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and disease mortality, grazing, and drought).

Three Condition Classes were developed to categorize the current condition with respect to each of the historic Fire Regime Groups. The three classes are based on low (Condition Class 1), moderate (Condition Class 2), and high (Condition Class 3) departure from the natural (historical) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2001). Criteria used to determine current condition include the number of missed fire return intervals with respect to the historic fire return interval, and the current structure and composition of the system resulting from alterations to the disturbance regime. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside. The relative risk of fire-caused losses of key ecosystem components increases as condition class designation increases.

The FRCC classifications for the Centennial Watershed based on the coarse-scale data are presented in Table 16. The data presented is the most current available and is valuable information to aid managers in estimating actual ground conditions. However, due to the limits of satellite-based imagery, the coarse-scale estimates presented in Table 16 may differ from site-specific assessments made by members of the interdisciplinary team. For example, the coarse-scale assessments obtained through satellite imagery do not take into account finer scale factors influencing condition class such as recent insect and/or disease outbreak, individual stand structure and associated biodiversity issues.

Members of the ID team performed additional FRCC assessments for site-specific areas within the following potential natural vegetation groups: Sagebrush – Cool With Trees, Mountain Shrubland With Trees, Douglas-fir Interior Rocky Mountains, Interior West Subalpine Forest, and Interior West Upper Subalpine Forest. The ID team found that most xeric and forest/shrubland ecotone habitats were highly departed from historic conditions (Condition Class 3). Higher elevation habitats better corresponded with the coarse-scale assessment results.

**Table 16. Fire Regime Condition Class**

| Condition Class | Description | Acres* | Example of Typical Management |
|---|---|---|---|
| 1 | Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Fires burning in CC1 lands pose little risk to the ecosystem and have positive effects to biodiversity, soil productivity, and hydrologic processes. | 76,949 | Historical fire regime is replicated through periodic application of prescribed fire or through fire use. |
| 2 | Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased) resulting in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Wildland fires burning in CC2 lands can have moderately negative impacts to species composition, soil conditions, and hydrological processes. | 257,655<br><br>(NOTE: Actual forested cover in this condition class is approx. 2,688 acres. The remainder is sagebrush/ grassland.) | Moderate levels of restoration treatments are required, such as a combination of prescribed fire with mechanical/hand treatment. |

| Condition Class | Description | Acres* | Example of Typical Management |
|---|---|---|---|
| 3 | Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals resulting in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Wildland fires burning in CC3 lands may eliminate desired ecosystem components, exacerbate the spread of unwanted non-native species, and result in dramatically different ecological effects compared to reference conditions. | 3,223 | High levels of restoration treatments, such as mechanical treatments, are required before fire can be used to restore desired ecosystem function. Intensive efforts, which may include seeding, herbicide application, biomass removal, and other types of rehabilitation, are required for CC3 lands. |
| Current conditions are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction, and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Laverty, Williams 2000). | | | |

* The acreage calculation for each condition class is based on the hydrologic unit scale. They include all ownerships to more accurately describe the current situation. Acreage discrepancies occur through calculations made in GIS.

Based on the coarse-scale FRCC analysis, site-specific FRCC assessments, and historic photos of the area, the forested portions of the Centennial Watershed are moderately to severely departed from natural (historic) conditions.

The Centennial Valley can be broken into two sections when discussing forest health and fuels management. The south side of the valley is predominantly forested, while the north side of the valley is sagebrush covered with island patches of trees. On both sides of the valley, forest habitat types change along the elevational gradient and include lower elevation aspen forests, Douglas-fir dominated forests (6500'-7000'), lodgepole pine forests (7000'-7700'), and subalpine fir forests (7700'-8800').

**South Centennials**

Low elevation mountain big sagebrush/Douglas-fir plant associations exhibit departures from historic fuel loading, structure, species composition, and biodiversity. Lack of disturbance, primarily fire, has allowed conifer encroachment into sagebrush, resulting in a loss of sagebrush habitat. The lack of disturbance has also allowed conifer encroachment and dominance within aspen clones, resulting in a substantial loss of aspen habitat across the landscape. Research indicates that greater than 70% of the area historically occupied by aspen has been lost in mid to lower elevation forests of the eastern Centennial Mountains, much of which is attributed to conifer encroachment and eventual species conversion (Gallant et al. 2003). Without the regulatory effects of fire, conifer stand densities and fuel loading have increased and stand structure has shifted.

Between the forest/shrubland ecotone and approximately 7500' elevation, Douglas-fir and lodgepole pine dominate with scattered aspen clones present. The recent drought and increased competition for limited resources has resulted in increased forest susceptibility to insect and/or

disease infestations and subsequent tree mortality. Currently, dwarf mistletoe is present within the area but does not appear to be affecting tree growth or vigor to a large extent. Spruce budworm is present at epidemic levels and affecting all species of conifer present except lodgepole pine. While spruce budworm does not usually cause direct tree mortality, it will predispose trees to attacks by other insects or diseases. Mountain pine beetle is present at epidemic levels and has resulted in mortality of approximately 40-60% of mostly larger size diameter lodgepole pine, however smaller size class lodgepole are also being attacked and killed. The Douglas-fir bark beetle is present at epidemic levels on the east portion of the South Centennials and endemic levels on the west portion of the South Centennials, and is causing mortality of only the largest diameter Douglas-firs. Due to the lack of fire disturbance, conifers are encroaching and dominating the aspen clones, as evidenced by numerous aspen remnants, and the Douglas-fir savannah structure is being replaced with multi-storied, unnaturally dense conifer stands.

Above approximately 7500' elevation, the dominant timber type is lodgepole pine and subalpine fir. The highest elevations are occupied by subalpine fir, with concentrations of Engelmann spruce in moist areas. The balsam bark beetle is present at epidemic levels and has resulted in mortality of approximately 60-80% of mature subalpine fir. Scattered whitebark pine is present but approximately 90% of the mature population has been decimated by white pine blister rust. The decline of whitebark pine is a biodiversity issue, particularly for wildlife species which depend on white bark pine seeds as a food source (e.g. grizzly bears). These higher elevation forest types have not missed a fire interval, though fuel accumulations are currently present to support a stand-replacing wildfire, as evidenced by the 2003 Winslow Fire. The Winslow Fire exhibited higher burn severity, larger stand-replacing patch sizes, and an absence of surviving trees compared to historic fire patterns (unpublished data, N. Korb).

Across the south side of the Centennial Valley, the potential for stand replacing wildfires has increased due to the increased density of forested stands and the large amount of standing dead material.

**North Centennials**

Douglas-fir, lodgepole pine and aspen are present in scattered patches on the north side of the Centennial Valley. Due to their relative infrequency, the timbered stands are "islands" of important wildlife habitat. White pine blister rust and mountain pine beetle is limited in extent, Douglas-fir bark beetle is present at endemic levels, and spruce budworm is approaching epidemic levels. Aspen is declining, but not to the extent of the south side of the Centennial Valley. Historically, continuous fine fuels and frequent fire maintained the Douglas-fir savannah structure. Fire exclusion has resulted in a structure shift to dense even-age conifers surrounding these old, large diameter trees.

## Analysis and Recommendations for Forest Health and Fuels Management

Map 4 shows a coarse-scale approximation of areas with forest health concerns within the Centennial Watershed. Vegetation data from satellite imagery and professional knowledge of the landscape were used to identify these areas, which are depicted across all ownerships to more accurately describe the current situation. Treatments would only

occur on BLM administered lands or in cooperation with other landowners. Forest health concerns include occurrence or high susceptibility for insect/disease outbreak, increased fuel loading, and departure from the historic range of variability (species composition, structure, etc.).

The National Fire Plan, Healthy Forests Initiative, and Healthy Forests Restoration Act emphasize reducing hazardous fuel accumulations and restoring the health and natural processes within forests and rangelands. In addition, management should prioritize the protection of areas that enhance, restore, or maintain plant communities that are critical for endangered, threatened, or sensitive plant and animal species. As a result, the use of prescribed fire and/or mechanical treatments, or other means of treating hazardous fuels, to promote healthy forest conditions will be incorporated into land use planning.

**Issue 1:** The physical characteristics of a site and lack of natural disturbances has allowed conifers to encroach into grass, riparian, and aspen communities.
Recommendations are included under Uplands, Riparian, and Biodiversity sections.

**Issue 2:** Plant species age class, diversity, and distribution that are not within their historical range of variability for the forest and shrub communities. Utilize prescribed fire and/or mechanical treatments to break up hazardous fuel continuity, promote successful aspen regeneration, and restore conditions to within the historic range of variability. Where desired, create a mosaic pattern of vegetation within these areas. Treatment should be an appropriate scale for the area.

**Issue 3:** Weed infestations and the effects of fires on the noxious weed spread.
Identify areas with existing noxious weeds established. Mitigate impacts by treating noxious weeds before and after implementing hazardous fuels treatments.

**Issue 4:** For prescribed burning, require appropriate rest from livestock grazing.
Require rest from livestock grazing in proposed treatment area one year prior to treatment and a minimum of two growing seasons following the treatment. Coordinate implementation and grazing schedule with permittees.

**Issue 5:** Minimize the effects of smoke from prescribed burning on air quality.
Meet the Montana air quality standards by burning when atmospheric conditions allow for good dispersion and transportation of smoke caused from prescribed burning.

## General Recommendation for Watershed

Analyze the use of prescribed fire, mechanical treatments, or other means to mitigate conifer establishment and domination in aspen clones, conifer encroachment into sagebrush sites and/or riparian areas, and address other site specific concerns. Consider developing and implementing a Fire Use Plan for the Centennial Wilderness Study Area. Focus treatments within areas that are in Condition Class 2 and 3 and in areas historically dominated by aspen, whitebark pine, and Douglas-fir savannah. The following allotments are recommended to be included in the Analysis:

- Fish Creek
- Price Creek
- Shambo Units
- Peet Creek
- Long Creek AMP
- Duff Creek AMP
- Davis Common
- Long Creek SGC
- Morton Ind. SGC
- Tom Creek
- Unleased Tracts between Duff Creek and Tom Creek

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